

IRON AGE

DECEMBER 27, 1951
VOL. 168, NO. 26

THE IRON AGE
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THE IRON AGE

DIGEST

of the week in metalworking

PAGE WINTER FORCES INDUSTRIAL SLOWDOWN

17 Snow storms and sub-zero temperatures held industrial activity to a snail's pace for several days. But
18 industry started to shovel out from under. Transportation lines
19 were clogged and workers had to struggle to get to work—if
20 they made it at all. Fortunately steel production held up.
21
22
23

PAGE FOUNDRY INDUSTRY MAKES EDUCATION PAY

19 Foundry Educational Foundation grants scholarships
40 and in-plant training to interest young blood in a
51 career in the castings field. Engineering graduates are schooled
53 for technical, supervisory, or managerial positions. Rewards
114 are better methods, smarter personnel and wider acceptance.

PAGE SHORT STEEL STRIKE SHUTDOWN IMMINENT

20 A steel strike of at least 3 days appears inevitable.
42 This may mean a week or more of production loss.
47 The strike may be called at midnight, Dec. 31. About 500,000
49 steel workers may go out. An international meeting of USWA
on Jan. 3 may respond to a U. S. plea to get back to work.

PAGE GRANT PRIORITIES FOR AUTO ENGINE TOOLS

22 Some automakers are getting priorities for obtaining
66 machine tools needed to make new auto engines.
70 These priorities will enable automakers to complete tooling
72 which would have been halted or hindered by a recent NPA
74 order. Ford, Dodge have extended ratings to tool builders.

PAGE DEFENSE WILL GET GREEDIER IN 1952

25 Defense production will begin to jar civilians in
93 earnest next year. It will cut itself larger portions of
96 the total production pie. Beginning with the first quarter, DPA
98 says, defense and supporting industries will grab 40 pct of
100 carbon steel supplies, and over 60 pct of aluminum and copper.
102
104
107

PAGE SWITCH TO PLATE MAY HIT AUTOMAKERS

42 Light gage steel may be sacrificed for more plate
9 capacity. Automobile production is down in a year-
11 end lag. Inventories, new models, and customer resistance are
13 blamed. Car prices have not risen under the Capehart Amend-
88 ment as feared, but buyers are still balking at high prices.

PAGE WRECKERS ARE NOT UNHAPPY OVER M-92

47 West Coast's autowreckers' complaints come from
small operators and are generally based on misinterpretation of the regulation. Preferred to WW II order which destroyed valuable parts. Yards in area should be cleaned out of cars affected by M-92 within 6 months. May yield 200,000 tons.

PAGE HOW A NEW DEFENSE PLANT TOOLED UP FAST

59 Some 70 pct of the machine tools in this tank drive
plant are used. New tool orders avoided hard-to-get types of tools as much as possible. Though this policy has resulted in unusual applications, they do the job. And months were saved in getting this Chevrolet plant into operation.

PAGE INDUCTION, GAS MELTING COST COMPARED

62 The use of low-frequency induction furnaces and gas
furnaces in the diecasting industry is evaluated. The
induction furnace offers close temperature control, cooler
working conditions. Gas furnaces seem to be more adaptable
though some are designed for foundry, not diecasting, use.

PAGE SAE MEETS ON ALLOY CONSERVATION TASK

74 In the 9 months since Div. VIII of the SAE Iron and
Steel Technical Committee was formed, the use of
boron steels has jumped from practically zero to 8 pct of alloy
output. By the 1st quarter of 1952, it will be up 10 pct. Armed
services are planning long-range research on alloy conservation.

PAGE STEEL MARKET IN TURMOIL OF UNCERTAINTY

93 Early this week the steel market was in a turmoil of
uncertainty, as strike fear gripped all parties. Even
a short steel shutdown would smash to smithereens all Controlled
Materials Plan schedules for defense and civilian consumers
alike. Meanwhile, cold weather may bring a quick scrap crisis.

NEXT METALS REVIEW, OUTLOOK, AND STATISTICS

WEEK Iron Age's 97th annual review and facts issue features
reviews of 1951 and outlook for 1952 in metalworking
and metal producing fields. A 96-page statistical section has
valuable data on metal production and use. Other features
include a controls digest and defense personnel directory.

Only with B. F. Goodrich grommet belts can you make these savings!

Save 3 ways! Investigate today!
Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of

the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give $\frac{1}{3}$ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all..."

"Ordinary belts lasted only 5 or 6 weeks... B. F. Goodrich grommet belts are in their sixth month of service..."

"Previous belts suffered from shock loads, wore out fast... BFG grommet belts have been in service 2 years with no shut-downs..."

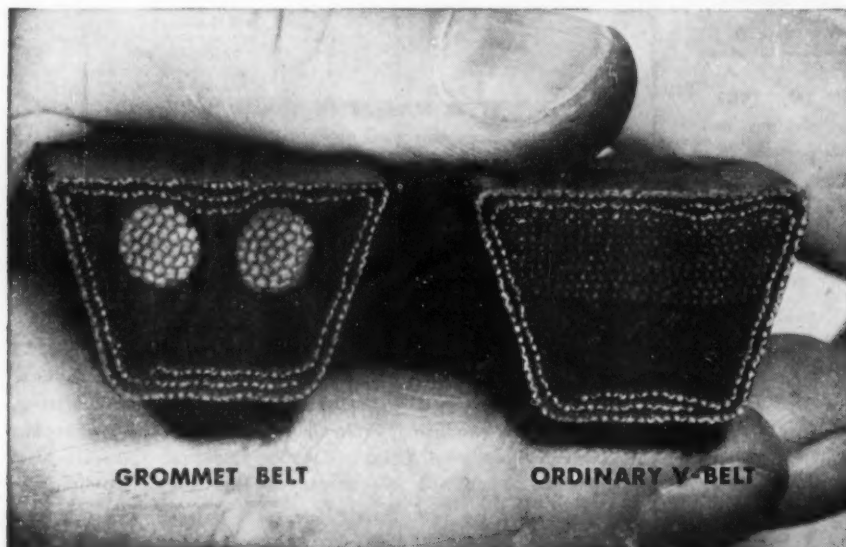
There are hundreds of cases like these.

They cost no more

BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY
B.F. Goodrich
FIRST IN RUBBER



The B. F. Goodrich Company
Dept. IA-12
Akron, Ohio

- ☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.
- ☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name _____

Firm Name _____

Street Address _____

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State _____

The Steel Wage-Price Case

ECONOMIC conditions during the past 10 years have given a lot of help to Philip Murray in forcing wage increases in steel. He has also had a friendly Administration in Washington. Because of these two factors he has had power to get pretty much what he wanted.

Now we are building for defense. We have a strong nondefense demand for steel. There is a chance that the present Administration may not be returned to power next year. Now would seem to be the time—in the union's eyes—for Mr. Murray to try and get all he can, while the getting is good.

It looks as though he is taking that tack with his 22 demands upon the steel industry—slightly more than 30 days before the current contracts run out. He threw the book at steel firms and he will strike if necessary to make substantial gains.

The steel industry is now over the biggest barrel in its labor history. Steel cannot grant any wage increases unless it gets an adequate price increase. Furthermore it has no control over either wages or prices. Washington, which is supposed to control wages and prices, is balking on relief to steel firms even if any wage increase is considered favorably.

Cost of Mr. Murray's demands runs from 48¢ to 53¢ an hour. For sure they all can't be met even if steel wanted to meet them—which it doesn't. Mr. Murray knows as well as everyone else that he won't get anywhere near what he is asking for—a completely new contract with wage increase, and other fringe items.

Steel people say they won't budge on wages unless they get a price increase. A small increase under the Capehart Amendment to cover costs up to July 26, 1951 will not be the answer. The case is hurtling towards a steel panel hearing, an 80-day postponement of a strike and possibly a ruling favoring the union with no relief for the steel industry—and then another strike threat.

Does the government control both wages and prices or does it control prices only and give double talk on wage break-throughs? Sooner or later it must decide. As things are now, government believes in stabilization for prices only.

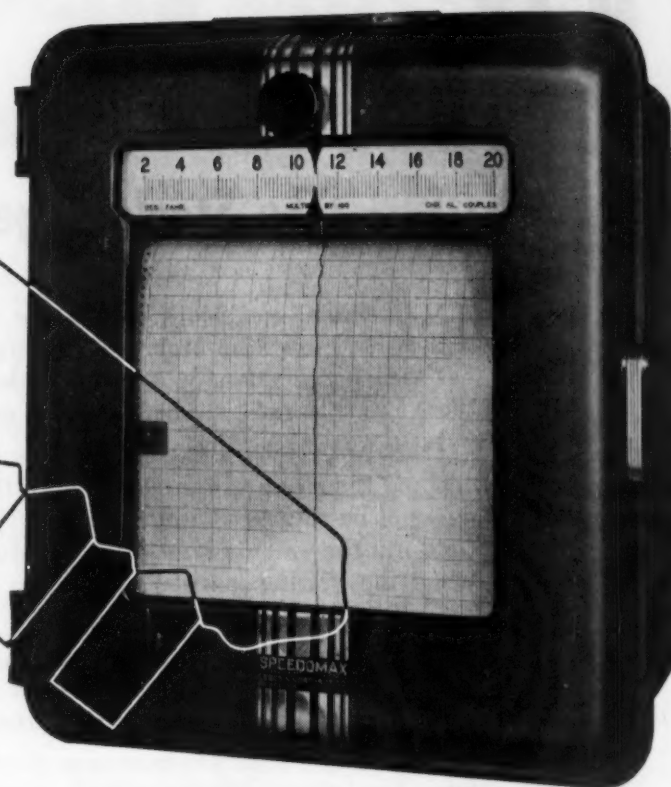
Tom Campbell

Editor

TEMPERATURE CONTROL

Matched
to your
plant's

**FURNACE
PRODUCT
PRODUCTION**



Need to get more work out of your furnaces and ovens? The pyrometer that fits the heating equipment, the product and the production need can do a great deal to turn out more tonnage, and also more that meets specifications.

Two Types of Control

The secret of successful automatic control is very simple; just turn the heat up and down in the particular way the furnace and product prefer. And there are only two general ways: On-Off Control, and Three-Function Control.

On-Off Control Can't "Think"

On-Off Control turns the fuel all the way up when temperature drops to a predetermined low point; turns it all the way down again at the specified high point. Temperature will of course undershoot and overshoot; when cycling is inside bounds, this simple control is very popular.

Three-Function Control Can "Think"

Instead of turning fuel up and down at preset limits, three-function control in effect, keeps looking at temperature trends. If they are trying to

get out of hand, the Controller heads them off. This "thinking" is done in three ways:

1. Fuel is turned up and down in proportion to the furnace's heat change. (Function one)
2. If the furnace doesn't respond when the fuel is changed, the instrument waits a little—moves the valve again—keeps this up until the furnace does respond. (Function two)
3. If the temperature jumps, as when a heated charge is removed or a fresh charge put into a furnace, the speed of the resulting change can be considered by the Controller. (Function three)

User Tunes the Control

By turning dials on the control pyrometer, the user tunes the three functions to the process: he simply uses his common sense and experience. A big benefit is thus: that every furnace control can be tuned by the best-qualified man in the plant.

Further information on request; contact nearest L&N office or 4956 Stenton Ave., Phila. 44, Pa.

LEEDS  NORTHROP

Dear Editor:

Letters from readers

Plaudits for Iron Age

Sir:

I am not an adept fan letter writer. Occasionally something is so good that the stiffest of us must bend to bow.

I think you have one of the most adequately edited technical journals I read. The editorials deserve to be framed!

My best wishes for your continued success.

J. W. HALINA
Microwave Section Engineer

Royce Works
Canadian General Electric Co. Ltd.
Toronto

Let's Start Over Again

Sir:

Congratulations on the splendid editorial "Let's Start Over Again" which appeared in your Dec. 6 issue. I hope you will keep it up.

H. WHITE
President

White Advertising Co.
Cleveland

Anti-Justice

Sir:

"Anti-Justice", appearing in your Dec. 13 issue, is a wonderful editorial and should bring to attention some of the evils that prevail today.

J. F. MURRAY

Reading Tube Corp.
Long Island City, N. Y.

Good Supply

Sir:

JUST READ DEC. 13 ISSUE. NOTICE THAT YOU MENTION ON P. 87 SHORTAGE ITEMS AS CONSISTING OF STEEL, COPPER, ROLLER BEARINGS, HARDENED GEARS AND PINIONS, AND CASTINGS. WANT TO ASSURE YOU THAT TAPERED ROLLER BEARINGS ARE NOT IN SHORT SUPPLY. WE HAVE MET EVERY REQUIREMENT OF THE CRANE INDUSTRY AND CAN CONTINUE TO SUPPLY BEARINGS IN PROPER QUANTITIES AND DELIVERIES AT PROPER TIMES. HOPE THAT YOU REALIZE THERE IS MORE THAN ONE TYPE OF ROLLER BEARING. OUR COMPANY MAKES TAPERED ROLLER BEARINGS AND WE MAKE THEM IN SUFFICIENT QUANTITIES TO SUPPLY ALL NEEDS.

W. E. UMSTATTD
President

Timken Roller Bearing Co.
Canton, Ohio

Emerycrete

Sir:

Having read with much interest in your Nov. 29 issue the article on p. 60, I would like to know where we can obtain Emerycrete which, according to the author of this article, is much harder and more durable than concrete.

E. D. CLAPP
President

E. D. Clapp Mfg. Co.
Auburn, N. Y.

For more details contact Walter Maguire Co., Inc., 60 E. 42nd St., New York 17, N. Y.—Ed.

3-Dimensional Planning

Sir:

The article "Save Time, Money With 3-Dimensional Planning" in your Nov. 8 issue interested us very much. We would be happy to receive any additional information which you might have available on this subject.

C. C. CRAMER

Dubuque Stamping & Mfg. Co.
Dubuque, Iowa

Further information can be obtained from Visual Planning Co., Inc., Oakmont, Pa.—Ed.

Croning Process

Sir:

Regarding the shell molding process which has been mentioned in some of the issues of THE IRON AGE, we are wondering whether there is more information available.

Where are some of the foundries who are currently using this process?

O. KRAUSS

Whirlpool Corp.
St. Joseph, Mich.

The articles "Jobbing Foundry Adopts C-Process" and "Resin Makers Push Croning Process" appearing in our Nov. 15 issue brought conditions up to date at that time. For a listing of the companies who have taken out licenses to use the Croning process contact Mr. Fischer, Crown Casting Associates, Boston, Mass.—Ed.

Wide Circulation

Sir:

We would appreciate very much your permission to reproduce the article "More Titanium Oxide Now Available" which appeared in two sections in your Nov. 1 and Nov. 8 issues.

We would like to circulate this article to our own organization, and possibly to the trade, both in the United States and Canada.

C. G. OLLINGER
Assistant Manager

Advertising & Sales Promotion Dept.
National Carbon Div.
Union Carbide & Carbon Corp.
New York



Help Lower Unit Production
Cost to Meet Competition
Profitably...

Simplified screw driving, bolt setting and nut running mean lower unit cost. This is possible with Pheoll products because they are inspected through all manufacturing steps from coil wire or bar stock to the finished product.

All threads, whether rolled or cut, are carefully gauged to American Standards. Screw and bolt heads are formed, slotted or recessed to meet rigid engineering requirements. Overall quality of the finished product is uniformly high. Precision head formation on all bolts as well as engineered slots and recesses in all screws means less wrench and driver slippage.

Pheoll engineers will recommend the correct type, size and finish of standard or special screws, bolts and nuts for your needs.

WHAT PHEOLL INDUSTRIAL FASTENERS MEAN TO YOU

- Simpler and speedier assemblies.
- Less worker fatigue — more units.
- Improved product appearance.
- Added latitude in product design.
- Immediate and dependable source for standardized, interchangeable screws, bolts and nuts especially suited to mass production.

CHECK THESE PHEOLL PRODUCTS FOR YOUR NEEDS

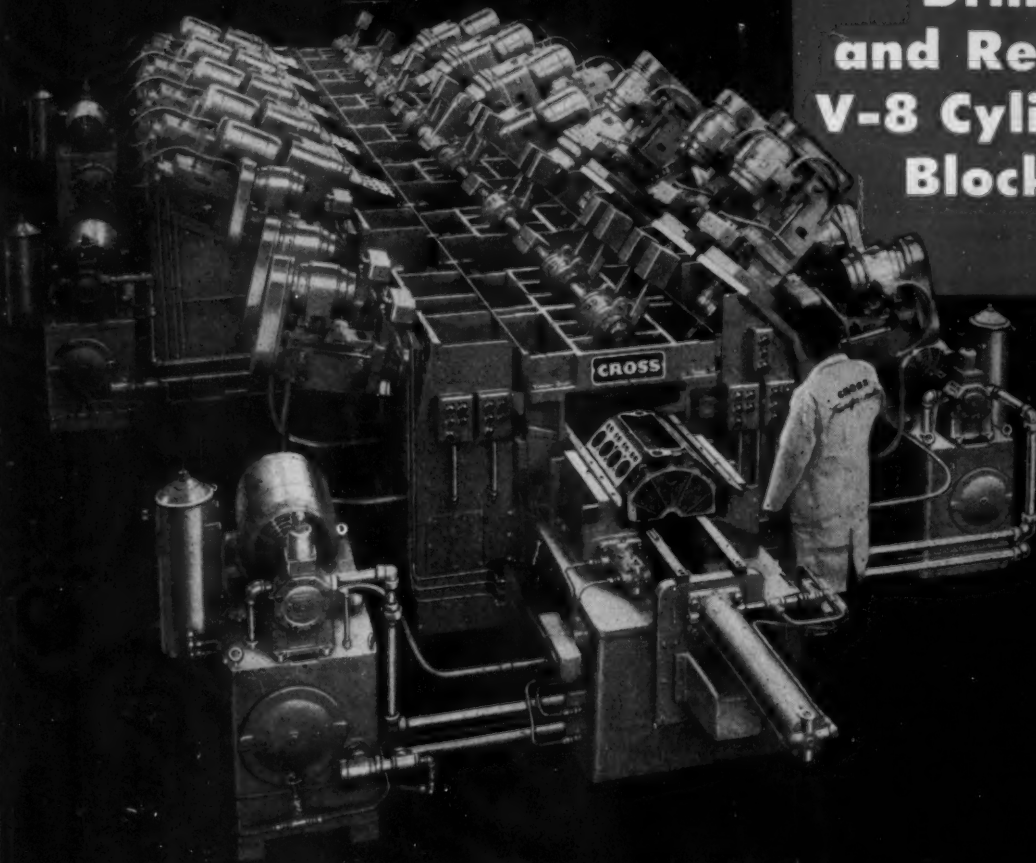
- ☐ Machine Screws
- ☐ Sems
- ☐ Tapping Screws
- ☐ Square Head Set Screws
- ☐ Threaded Cutting Screws
- ☐ Cap Screws
- ☐ Phillips Recessed Head Screws
- ☐ Machine Bolts
- ☐ Wing Nuts
- ☐ Knurled Nuts

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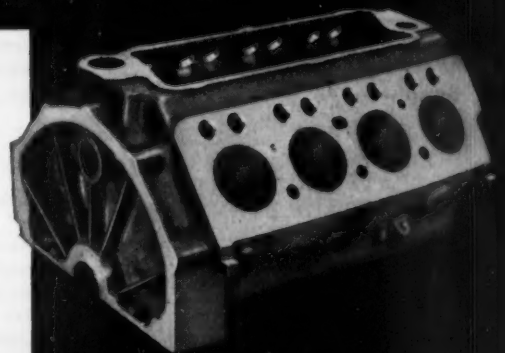


Another Transfer-matic by Cross

Drills and Reams V-8 Cylinder Blocks



- ★ Drills and reams dipstick hole; drills oil feed holes for heads; rough and finish reams tappet holes on 82 cylinder blocks per hour at 100% efficiency.
- ★ 15 stations: one loading, three drilling, four reaming, one cleaning and six inspection.
- ★ Automatic transfer from station to station.
- ★ Automatic gravity operated cam clamping.
- ★ Other features: Construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; a coolant system; chip conveyor for automatically moving chips to a central disposal point; automatic lubrication.



Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

Fatigue Cracks

by Charles T. Post

Picasso's Metallurgy

Your f.f.j.'s erudite technical editor, D. I. Brown, was digging through the graphs and formulae of an A. S. M. technical paper entitled "Grain Shapes and Other Metallurgical Applications of Topology" the other day when he stopped short at Fig. 3.

"That," he thought, "looks like a Picasso."

And sure enough, it was a Picasso. To the paper's author, Dr. Cyril Stanley Smith, director, Institute for the Study of Metals, University of Chicago, art, like any other material structure, boils down to a problem of filling space. The basic mathematical concept of space filling, Dr. Smith indicates, is the same whether you deal with metallic structure, soap froth, or cell structure of animals and plants.



$$P - E + C = 1$$

$$35 - 86 + 52 = 1$$

"In any network of lines in two dimensional space, there exists a relationship between the number of polygons and the number of edges (polygon sides) and corners (apices)," he holds. "The relationship is actually very simple; namely $P - E + C = 1$ in which P, E, and C are the number of polygons, edges, and corners respectively..."

So if you want to get out of the shop or laboratory and live like Picasso, just paste that formula in your hat, or, more appropriately, your beret. Use whatever painting experience you gained in redecorating the kitchen or bathroom, and you're practically assured of a one-man show at the Museum of Modern Art.

Scrap in Three Colors

Possibly the most spectacular effort by a single scrap firm to get in the scrap was a big prize contest sponsored by the Gus Holman Co., Sheboygan, Wis. Holman offered a \$312 television set as first prize plus 24 cash prizes. The contest announcement was in a full page advertisement in the Sheboygan Press printed in red, white and blue—and you know what that costs. All the contestants had to do was to complete, in 25 words or less, the sentence, "Scrap iron, vital to our defense program, should be turned over to the Gus Holman Co. because:". If the contest resulted in a ton of scrap for every word that was written, it was a success all the way around.

Air Patrol

Another wrinkle in scrap collection is the use of an airplane for reconnaissance. W. E. Stipe, who operates a scrap yard at Diamond, in the vast, rolling wheat lands of eastern Washington, is a licensed pilot. Every day or two, he takes to the air, makes a note of the location of possible scrap, and turns the information over to local groups cooperating in the drive. They, in turn, get the scrap to his yard. So far this year, his flights have led to the location of over 1000 tons.

Puzzlers

It didn't take us long to figure out that, in last week's puzzler, Bob had five mules to start with and Abe had seven mules.

Two more answers to the number problem from R. A. Poirier, Black-Clawson Co., and L. D. Rice, Timken Roller Bearing Co., who points out that the number is obtained by dividing 1 by 7. He doesn't explain why it works, but it does.

Our answer to the circle problem has been verified by S. F. Magis, Wildwood, N. J.; C. E. Norton, Chicago; L. D. Rice, Timken Roller Bearing Co. and W. L. Havekotte, Firth Sterling Corp.

J. J. Reich, Reich-Huntington Iron Works, wants us to do this one in our heads: Which is greater, the circumference of a 10 ft diam circle or of two 5 ft diam circles? No pencils, please!



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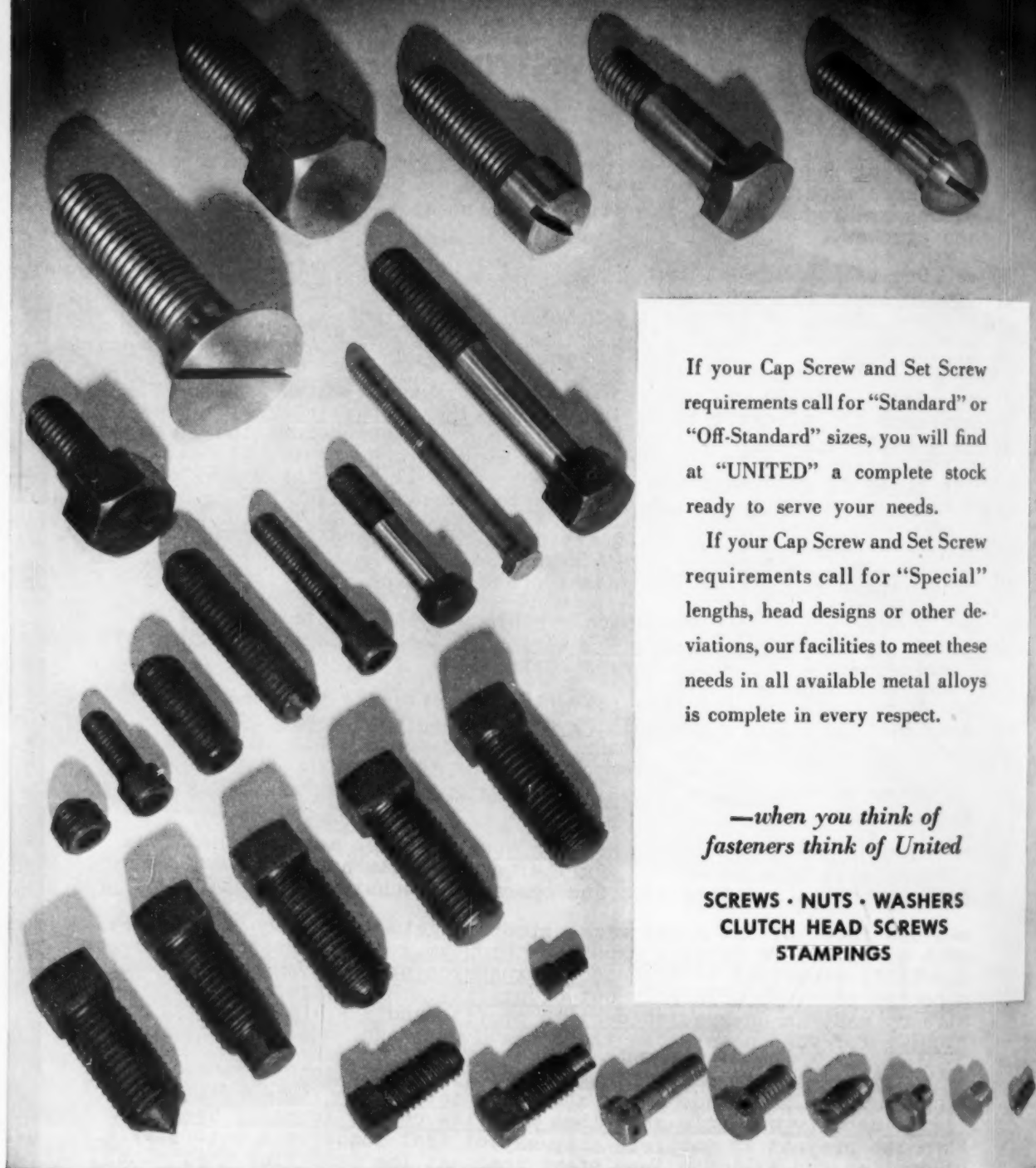
THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

THE IRON AGE Newsfront

- Direct reduction of powders of iron, chromium and nickel has been done experimentally, producing stainless steel. All three oxides are reduced simultaneously, with no liquid phase formed in the process.
- One of the first ships of any real size to be equipped with a controllable pitch propeller will be the U. S.'s first gas turbine powered vessel, a freighter now under construction. The propeller has been proving itself in trial installations on another freighter and on tugs.
- The Air Force has ordered new crash trucks in which crews can approach hot aircraft fires while remaining in the truck protected by insulated and ventilated compartments. Bigger motors and lighter construction will enable them to hit 60 mph in a minute, maintain top speed on good surfaces of 70 mph. They'll have three 35-gpm fog foam nozzles and a 200-gpm roof mounted turret nozzle.
- Birmingham pipe foundries may adopt a new French process for making small diameter pipe. A French engineer has spent the past month there explaining the process to local pipe companies.
- Powder metallurgy processes are being used to obtain special properties in water lubricated bearings. Work is being sponsored by Westinghouse at Armour Research Foundation.
- Some companies eligible for price relief under the Capehart Amendment apparently are holding back to see what happens in the steel wage-price battle. Either they hope to lump all increases for which they are eligible into one chunk or they regard Capehart adjustments as picayune compared to the possible cost of steel peace.
- Electrodeposition of pure molybdenum has been accomplished from a fused salt bath at 600°C. Further experiments are under way to perfect the bath composition and operating technique.
- One facet of the steel wage-price struggle which hasn't received much attention is steel's expansion program. Most steel companies are still committed to tremendous expansion programs which they had expected to finance largely out of profits. Higher taxes have already made an unexpected dent in profits and there just isn't the cushion for wage absorption there was a year ago.
- Allis-Chalmers research engineers trying to stretch the nation's copper supply have made pilot models of integral horsepower motors requiring only a little more than half the copper formerly needed. When the project is complete they expect that tomorrow's motors will be smaller and will use less steel too. At the same time they plan to maintain a slightly higher efficiency.
- A press designed to take advantage of the best features of hydraulic and mechanical presses, and using a conventional hydraulic die cushion, is now being built for cold extrusion of steel.

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INDUSTRY: King Winter Freezes Output

Several days slowup caused by snow storms and numbing cold . . . Transportation hit . . . Workers can't reach jobs . . . Steel output held . . . Scrap receipts sheer off—By E. C. Beaudet.

Industrial activity was held to a slow-motion pace for several days following the severe storm coupled with sub-zero temperatures which swept across the northern part of the country last week.

Transportation lines became clogged as rail and truck shipments were delayed and snow-bound workers experienced considerable difficulty getting to their jobs.

Fortunately steel production suffered very little from the effects of the paralyzing storm. Although movement within all storm-struck plants was considerably slowed down, production in most cases was maintained near high levels. A check of mills throughout the country revealed that only a slight loss of steel was expected.

Temporary Loss—Although some reported a loss of 15 pct in production for the first several days

after the storm, this is expected to be picked up. Mills in the Cleveland area reported some loss due to freezing ore and coal. Absenteeism because workers were unable to reach their jobs was one of the major problems affecting production. Other workers took on extra shifts with a resulting loss in efficiency.

The storm took its heaviest toll in transportation. Couplings and switches were constantly being thawed to keep cars and locomotives moving. Snow removal equipment was continually in use to keep rails and roadways clear.

As the freezing weather hit, interruptible supplies of natural gas fuel, including those for steel mills, were shut off to provide more gas for home heating. However, most were prepared with auxiliary fuels and the switch was made without difficulty.

Desperate fuel shortages in past

years have spurred industry to erect auxiliary systems to ensure the future. Steel plants have built storage tanks for industrial oil which can be used if cold freezes natural pipelines or when gas is diverted.

The ability of the mills to keep operating is a far cry from former years when the first onslaught of severe cold weather usually meant a quick cutback in production. Additional snow removal equipment was hired in some cases in advance of the storm.

Scrap Crisis—Although immediate production was not seriously curtailed, the storm's effect on the scrap supply was extremely serious. What steel producers have been hoping wouldn't happen has happened. One major producer in the East reported receipts had fallen off 50 pct and others suffered similar drop-offs. Truck shipments from out of town into Chicago fell from 50 to 60 to eight or ten per day. Rail shipments of industrial scrap requiring no preparation held up best of all.

While mill receipts fell off heavily, scrap collection at the other end was even worse. Collectors were unable to get at scrap both in the cities and rural areas. Preparation in dealers' yards was almost stopped because of absenteeism or inability to work in the severe cold. Some yards reported they didn't bother to start their equipment for days.

Pessimism on Scrap—As a result of the storm, some steel mill officials in hard-pressed eastern districts expressed pessimism over their ability to prevent a curtailment because of scrap loss.

Scrap and steel industries are now wondering if the present spell of bad weather is a prelude to a

STEAM HEAT: Bitter experience has taught industry it must adapt itself to operating through winter's freezing spells. One of the methods to keep raw materials flowing despite sub-zero cold is shown below. Iron ore is thawed out by jets of steam poked into freight car sides. Steam comes from locomotives.



COAL: European Production Low

Washington concerned over poor mine output record . . . First quarter deficit estimated at 8.8 million tons . . . Eight pct improvement over last period '51 . . . Winter will be crucial.

Europe's coal mines—hamstrung by outmoded equipment and an uninspired working force—continue to produce deficits as demand remains high.

Weeks after Washington officials had expressed serious concern over not-up-to-the-mark European coal production, the United Nations Economic Commission for Europe reported that Europe's coal deficit for the first quarter 1952 will be an estimated 8.8 million tons.

Washington's concern over inadequate coal production may prompt the 8 pct estimated improvement over the apparent 9.5 million deficit registered for the fourth quarter of 1951.

ECE officials are not yet content. The improvement is heartening but Europe's solid fuel situation remains alarming. ECE says the first quarter improvement resulted from a substantial decrease in import requirements of some countries. These requirements were established at an earlier ECE coal subcommittee meeting.

January through March fuel import needs of 18 countries and Free Trieste were placed at 18.3 million tons of coal and 5 million tons of coke. It was estimated that

Europe could supply 9.5 million tons of coal and 3 million tons of coke.

Steel:

Two Canadian companies plan installation of new facilities.

Two Canadian firms have announced the acquisition of new equipment as part of that country's steel capacity expansion.

Algoma Steel Corp. Ltd., Sault Ste. Marie, has reported its \$40 million program well underway, with completion scheduled for mid-1953. New equipment includes a sintering plant and a 25-ft hearth blast furnace to be known as No. 6. Capacity of the No. 2 openhearth shop is being increased, and rail and structural mill production will be doubled.

A Morgan Construction Co. mill, first of its kind in Canada, is also being installed. It is designed to produce 250,000 tons per year of finished steel products, including small bars, light structurals and strip up to 25 in. in width.

New Mills—Atlas Steels Ltd., Welland, Ont., will install a new continuous hot and cold rolling mill for the production of stainless steel strip, and a tube mill for welded

stainless tubing. New equipment should be in operation next February.

To finance its expansion, Atlas is offering \$5 million 4¾ pct first mortgage sinking fund bonds to mature Dec. 1, 1966, and an issue of \$3 million 5 pct debentures due Dec. 1, 1967. The latter offering has already been underwritten.

About \$6 million of the new financing will be spent for the new mills, and about \$555,500 will be used to buy lands and buildings from the government. Atlas now holds these properties under lease-option.

British Steel Production Short

Britain will not reach the 1951 target of 17,920,000 net tons of steel ingots and castings set at the beginning of the year. Shortages of coke, ore and scrap kept down the total for the first 11 months (48 weeks) to 16,674,560 tons, compared with 16,919,984 tons in the corresponding period of 1950. Total output for the year will be in the neighborhood of 17,640,000 tons, against 18,240,000 in 1950. The scrap drive is to be intensified.

Tories Push Denationalization

The British government is drafting the bill to de-nationalize the steel industry. It is expected to set up a new Iron and Steel Board which will begin to function while the bulk of the industry is still state owned. In this way the new system of control can be well established before state ownership is relinquished.

Suggestions that there may be a compromise with the Labour Party are ruled out, in view of that party's declaration that it will re-nationalize the industry if and when it was returned to office.

German Steel Output at New High

German steel production in October amounted to 1,250,000 tons, a new postwar high. At an annual rate of 15,000,000 tons, it was only slightly below the rate at which the British steel industry is currently working.

Special Report

Continued

a bad winter. With scrap in precarious supply all year long, a snarl-up of collections and transportation because of snow and cold could tip the scales dangerously.

The network of National Production Authority's scrap allocations system leans heavily on rail transportation. Shuttling scrap from one district to another—sometimes involving great distances—has bailed out scrap-desperate steel producers

many times this year. If railroads slow down or are tied up by snow, some large mills with only a few days' supply will go into the red. And that means loss of crucial steel production.

Steelmakers have been able to force rail shipments of iron ore deeper into winter with a steam-thawing method. Last year needed iron ore rode the rails to mills into freezing weather.

EDUCATION: Foundries Make It Pay

Foundry Foundation grants scholarships, in-plant training to interest young blood in casting industry . . . Rewards are new methods, smart engineers, wider acceptance—By W. W. Taylor.

Four years of service by the Foundry Educational Foundation to the entire castings industry is paying real dividends now. It is interesting more and more students in foundry work and fitting more engineering graduates into technical, supervisory, or managerial positions in the industry.

Much still remains to be done by the Foundation in forging liaison links between universities and the castings field but much has already been accomplished. The industry has shed old age and become young and vigorous—and of growing industrial importance. Men schooled in universities have used their technical abilities and talents for research to develop practical castings operation with lower grade raw materials.

Extra Knowledge—Prime purpose of the Foundation is to assist students in acquiring a foundry education through scholarships and in-plant training. Doing summer work between college terms adds extra knowledge to already full engineering courses. FEF does not insist that students going through college on its scholarships enter the foundry industry on graduation. Possessing a background in foundry engineering, the students will be able to use castings to the utmost advantage in their other industrial fields. They will also have an understanding of what makes the foundry industry tick.

Those students who do enter foundry work may be metallurgical, mechanical, electrical, or industrial engineers. Graduates start at the bottom rung of the ladder in the castings industry, beginning by feeling their way through the shop. Unlike old-time craftsmen they are not bound by custom or tradition and can take a fresh, scientific approach to their work.

Foundries have benefited by employment of FEF grads. Lacking superior materials handling and quality control methods, foundry operators are gradually overcoming these and other uneconomic operations through suggestions of their new engineers.

Colored Sands—One difficulty in some shops is distinguishing various types of sand for various cores. Paper tickets, often employed to designate sand types, are frequently lost. In one plant a new engineer worked out a plan which management put to immediate use with great success. The engineer used small amounts of different colored dyes in different sands. No trouble with tickets now.

Having worked up through the plant, FEF grads now serve as metallurgists, supervisors of cupola operations, quality control experts, core room superintendents, maintenance supervisors, or inspectors.

Without the interest of the 14 cooperating schools FEF would



"Oh yes, they give us junior partners a lot of leeway."

have been a lost cause. Universities have found that beyond creating added student incentives the addition of a full foundry course has brought them into another industry. Much time is spent either at local plants or in school research laboratories by professors who now serve as consultants to industry.

Donate Equipment—Equipping labs and workshops was one of the first problems of FEF. Industry offered equipment—old but in operating condition. Suppliers made direct contributions or cut prices to assist schools in getting programs under way.

Through its university advisory committee FEF helps in preparing or revising courses. As new advances are made, industry guides in pre-selection of courses. Today more emphasis is put on mechanical rather than metallurgical training. Graduates will fit better into the industry with this background of mechanical operation and time and motion study.

Since 1947, start of FEF scholarships, 21,000 engineering students have taken foundry courses. To date nearly 700 graduates have entered the casting industry. During summer vacations close to 1000 students have worked in foundries of all types and sizes. One Cleveland plant alone employs from 40 to 50 students each summer.

Acceptance—At first some of the smaller shops were reluctant to go along with the idea but many have changed their opinion after having witnessed the results. Old timers were wary of teaching these young fellows. Learning that the new men weren't after their jobs, the craftsmen became anxious to help in their practical training.

Continuing financial support has been a major problem for FEF. Under a new system of membership assessment, the future looks brighter. Additional bequests, gifts, and other contributions help to prolong the life and administration of FEF.

STEEL: Short Strike Shutdown Nears

Strike of 3 days probable . . . May stretch into week of production loss . . . About 500,000 workers will walk out . . . Plea from Truman expected at union meeting — By J. B. Delaney.

A steel strike of at least 3 days appears inevitable. This probably would stretch into a week or more of production loss considering time consumed in shutting down and resuming operations.

The strike will begin at midnight Dec. 31. It will affect virtually all basic steel producers, and involve about 500,000 employees. Additional thousands in the aluminum industry and in some steel fabricating plants will be affected.

Notable exceptions in steel will be the Weirton plant of National Steel Corp. and the Middletown operation of Armco. These plants are not under contract with the CIO United Steelworkers of America. Aluminum Co. of America and Kaiser Aluminum Co. will be struck, but the contract with Reynolds Aluminum runs until April.

Nothing can avert this strike except a pattern-setting agreement between steel producers and the USW to replace contracts expiring Dec. 31.

Truman Will Wait—It is doubtful that in the absence of an agreement even a personal appeal from President Truman could prevent the walkout. Mr. Truman is not likely to make such an appeal in advance of a strike.

The stage was set at Pittsburgh on Dec. 17. There, the union's 170-man wage policy committee reiterated a "no-contract, no-work" position. In effect this means that nothing short of a new agreement can prevent a strike. The chances of such an agreement being reached are virtually nil.

At this same meeting the wage policy committee directed President Philip Murray to call a special international convention on

Jan. 3. This convention, first of its kind in the union's 15-year history, will be held at Atlantic City. The 2500 delegates will consider "the seriousness of the situation which confronts the union."

And, with the steel industry down flat, it would be in a position to act promptly on any governmental plea for a resumption of work.

This plea will likely come from President Truman. In return for a resumption of work, the White House probably will offer to appoint a fact-finding board to consider justice of the union's demands.

Steelworker Demands—The union is asking for a package of considerable proportions. Murray revealed details of the union objectives last week. It wants:

- (1) A 15¢-an-hour pay increase.
- (2) An increase of $\frac{1}{2}$ ¢ in the increment between job classes. This increment is now 5¢. The increase would cost steel producers 4¢ to 5¢. an hour, on the average.
- (3) Complete elimination of geographical differentials between

North and South, and on the iron ore ranges.

(4) Elimination of all wage inequities.

(5) Increase in shift premiums, now 4¢ and 6¢, to 10¢ and 15¢.

(6) Eight paid holidays.

(7) Time and one-half for Saturday, double time for Sunday, as such.

(8) Increase in reporting allowance from 4 to 8 hours.

(9) Improved severance provisions.

(10) A greater voice in the setting up of incentives and in the assigning of men to jobs.

(11) The union shop.

(12) A better vacation plan—1 week for 1 year of service, 2 weeks for 2 years, 3 weeks for 5 years, and 4 weeks for 15 years. Present limit is 3 weeks for 25 year men.

Annual Guarantee—The union's wording of another demand—for the guaranteed annual wage—is significant. It wants a guarantee of 32 hours per week for 52 weeks, *less unemployment compensation*. This would apply to employees with more than 3 years of service.

The union strategy here is to make it more attractive to the industry to work for an increase in unemployment compensation benefits. This same strategy was used in the case of pensions, where the producers provide the difference between social security benefits and minimum pension figures determined by prior earnings and years of service.

Also significant was Mr. Murray's take-off on management prerogatives. He likened these prerogatives to conditions in Russia and so-called "yellow dog" contracts. From his remarks observers got the impression of extreme irritation and a strong desire to put the union in a position of having more to say about work schedules, job assignments, etc.

This could be the foot-in-the-door to union participation in management of the industry.



"There's a steelworker outside. He won't come in unless we give him portal-to-portal pay."

STRIKE: No Early Plea from Truman

Washington expects short strike . . . Mediators primed for action . . . Ching advises President against fruitless early plea . . . Murray feels Truman will back him—By G. H. Baker.

Behind the week-old steel wage talks in Washington that flared intermittently through the Christmas holidays, two main points now stand out in sharp focus.

(1) Phil Murray's USW-CIO is definitely prepared to strike about 70 pct of the nation's steel-producing capacity on Jan. 1.

(2) Government mediators, now far more familiar with the dispute than in other years at this point in negotiations, believe they can end the strike within 72 hours by promising arbitration and getting concessions from both sides.

Reports from the closed-door meetings in Washington early this week indicated that steel management was playing its cards close to the vest. Government mediators dropped hints that what had been suspected all along was true—that management spokesmen had yet to make their first counter-offer to the union. The industry wants some assurance of higher prices before it can act.

On Friday Cyrus Ching, Federal Mediation Chief, referred the deadlocked wage dispute to the White House.

"Not Unthinkable"—Murray repeatedly made it clear last week in his public statements that he sees nothing "unthinkable" about a strike. Mediators considered his stand a definite slap at Charles E. Wilson, Defense Mobilizer, who earlier had urged Murray to keep the steelworkers on the job during all negotiation talks.

Ching's wish to spare the President personal embarrassment led him to advise Mr. Truman that he felt an early White House appeal, however strongly worded, would have not the slightest effect on Murray. The USW-CIO leader's confidence in his stand stems from his firm belief that the White

House will back him up—directly or indirectly—in any event. In the 3 years that have passed since the latest presidential election, Murray has reminded the White House on several occasions of the CIO's contribution toward Mr. Truman's political success.

Aluminum:

Hitched to steel's wagon . . . Eye steel labor scene for pattern.

Negotiations between labor and the steel industry are being closely watched by the aluminum industry. All three aluminum producers have contracts with the United Steelworkers of America which expire shortly: Aluminum Co. of America and Kaiser Aluminum & Chemical Co. on Dec. 31 and Reynolds Metals Co. on April 15, 1952.

Alcoa has been dickered with the steel union but these negotiations were recessed for a couple of weeks and although recently resumed are still marking time waiting for a steel settlement. In the past, the union has made almost the same demands of aluminum as it did of steel—and they've received the same or, in some cases, a better deal in aluminum.

But nobody can predict how things will go under present conditions of controlled prices and wages. Aluminum industry officials aren't saying, but a substantial wage boost might very easily require higher prices—if the government will permit. This industry, however, is vitally concerned with keeping prices down.

Reynolds' Strike—At press time an estimated 6000 to 7500 tons of vitally needed aluminum production had already been lost at Reynolds' Troutdale, Ore., smelter and the company's Phoenix, Ariz., extrusion plant was also strike-bound. The Phoenix strike was

Inland Left Speechless

Inland Steel's negotiations with the United Steelworkers of America resumed today with a demand for a 37¢ an hour general wage increase. In addition to 37¢ general boost, the union asked for 15¢ additional increase for roughly one third of the 15,000 employees in the bargaining unit.

When asked for comment on the union pay demands, a spokesman for the company said he was speechless.

On top of these hourly increases, totaling as high as 52¢, the union has demanded shift differential increases, extra overtime allowances, paid holiday provisions, and additional vacation time estimated by the company to amount to 43¢ per hour at present wage rates and proportionately higher at any increase in basic rates.

This demand of 37¢ asked for Inland is double the 18½¢ demanded of U. S. Steel and compares with 5 to 6¢ an hour calculated to be permissible under wage stabilization regulations.

reportedly touched off by a dispute between a foreman and an employee. Troutdale workers struck in sympathy.

Company president R. S. Reynolds, Jr., proposed that an impartial board decide who is right and that the company pay the employees' lost wages before Christmas if they returned by Dec. 19, and that the union, if found wrong, reimburse the company for these wages. It should again be noted that the Reynolds-USW agreement contains a "no-strike" clause and does not expire until Apr. 15, 1952.

The strike was finally settled last Wednesday night. Union and company issued a 3-point joint statement saying: (1) The USW feels it would be impractical to accept the proposal of R. S. Reynolds, Jr., (2) USW and Reynolds Metals have reached an agreement on procedures for settling the dispute, and (3) production at both plants is to be resumed as soon as possible.

AUTOS: Tool Priorities for Engines

DOU-4 rating granted to Ford and Dodge . . . Partially nullifies effects of M-41 . . . Some tools still needed for new models . . . Could not be converted to war work—By G. Elwers.

Priority ratings are being granted to several automobile manufacturers for obtaining machine tools needed to make new automobile engines. Rating DOU-4 has been extended to several machine tool builders by Ford and by Chrysler's Dodge Div. Indications are that the same priority may be issued for Buick, Mercury, and Ford tractor engine tooling. Ratings normally extended for plant expansion are being obtained through the Defense Transportation Administration.

These priorities will nullify in these cases the effect of the recent National Production Authority order reserving most machine tool output for defense. The backlog of the machine tool industry has grown to a point where defense projects are being delayed for lack of tools. NPA's M-41 had set aside 70 pct of machine tool production for military orders.

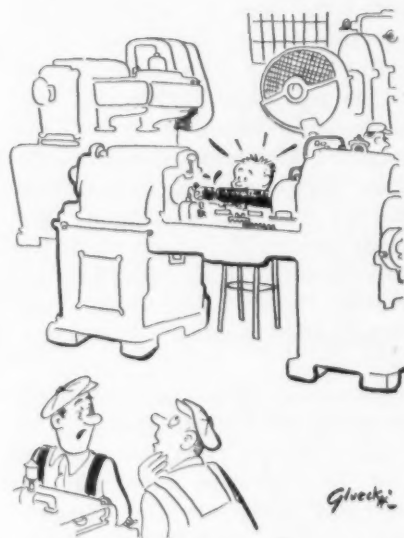
Civilians Get Balance—The remaining 30 pct was used by machine tool builders to fill essential civilian priority orders and non-priority work. In an effort to utilize all machine tool production capacity for defense, NPA last month revised M-41 to ban all shipments of machine tools to non-priority customers after Feb. 1.

Most of the machine tools required for production of the new Ford V-8, Dodge, Mercury, Buick, and Ford tractor engines have already been delivered or will be completed and shipped before Feb. 1. However, M-41's revision would have stopped work on a few machines without which all the others would have been useless. Most of these are huge transfer machines specially designed for use in making a specific automobile engine part and could not be converted to defense production.

Big Money—It is believed in Detroit that the decision to give priority aid for completion of these civilian machine tools was prompted by the huge investment tied up in these engine programs, and by fears of unemployment problems in Detroit.

Millions of dollars are tied up in the machine tools already completed for production of these new engines, which cannot be put to use until a few more machines are delivered. Many machine tool builders have large percentages of their capital invested in work-in-progress for the huge transfer machines which could not be shipped and paid for without this priority assistance. Autoworker unions have been greatly concerned with unemployment in Detroit due to cutbacks in production, and their voices are heard loudly in Washington.

In most cases it is believed that completing work on these civilian machine tools will divert little effort from construction of machine tools for defense. However,



"What's so wonderful about it? I have to do all the set-ups for him."

in at least one case a machine tool plant which has been doing 100 pct defense work in recent months will have to slow down on some of it in order to fit automotive machine tools into the production schedule.

Midget Car:

Steel controls stymie growth plans of midget car builders.

Clud Dry and Dale Orcutt are good examples of how harassed small businessmen can be these days. After 9 years of planning and hard work they're stymied on how to get enough steel to produce their tiny King Midget car.

About the size of a midget racer, this small two-seater is 8½ by 4 ft. Demand has pushed production above 90 cars a month. Somehow they've got to boost production to fill new orders from Mexico and Hawaii.

Good Mileage — The canvas-topped King Midget is powered by a one-cylinder 23-cu in. Wisconsin engine, rated at 7½ hp. The car will hit up to 40 mph, averages almost 60 miles per gal. A 35-v generator provides magneto ignition.

Clud Dry told THE IRON AGE that future plans call for a 300-pct increase in production, if they can get the steel through Controlled Materials Plan. The car weighs only 500 lb, practically all steel.

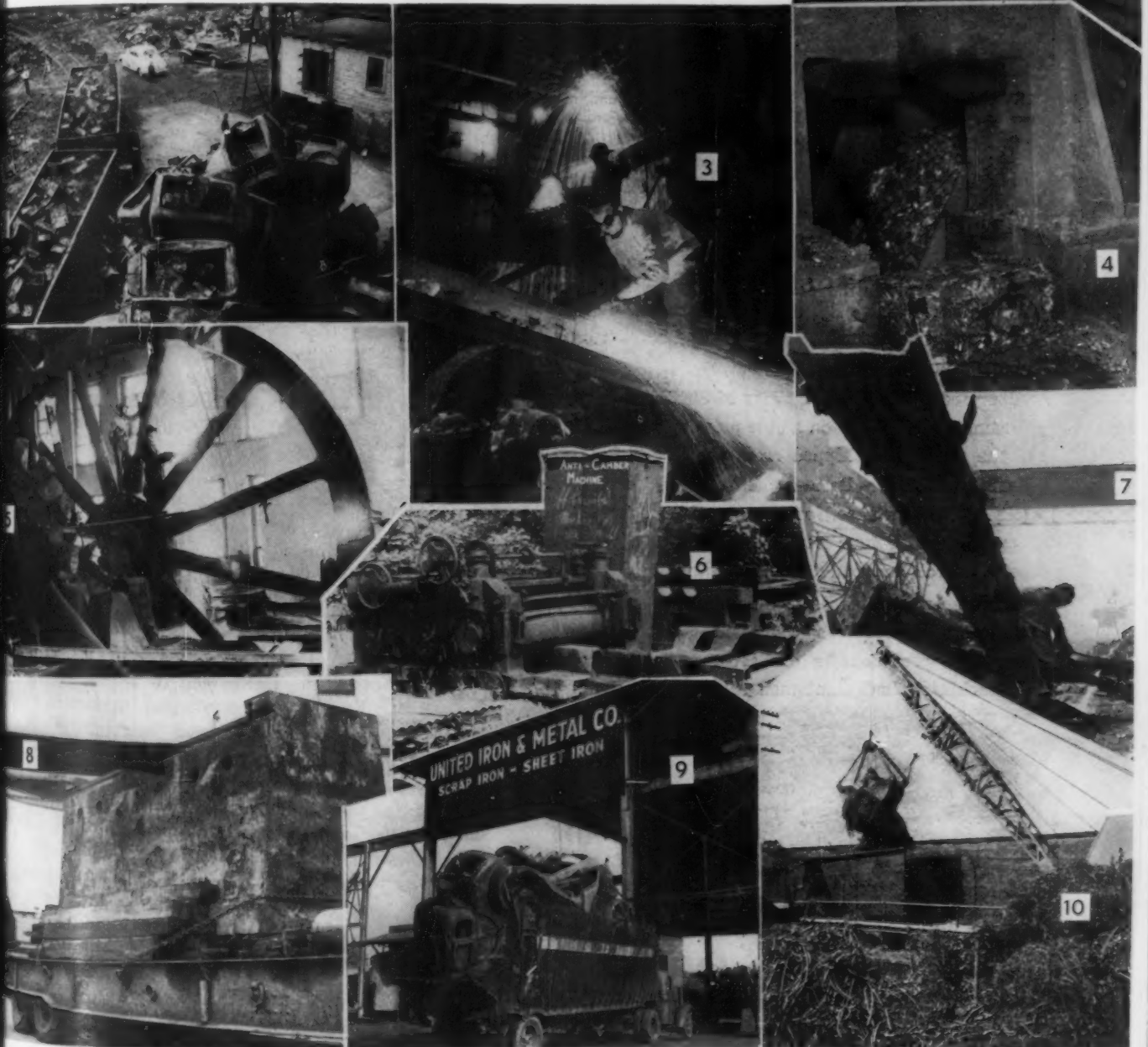
Deep drawing and straight forming presses are used to shape the body. The tooling situation for the presses is pretty well in hand, and the engine is made by the Wisconsin Engine Co.

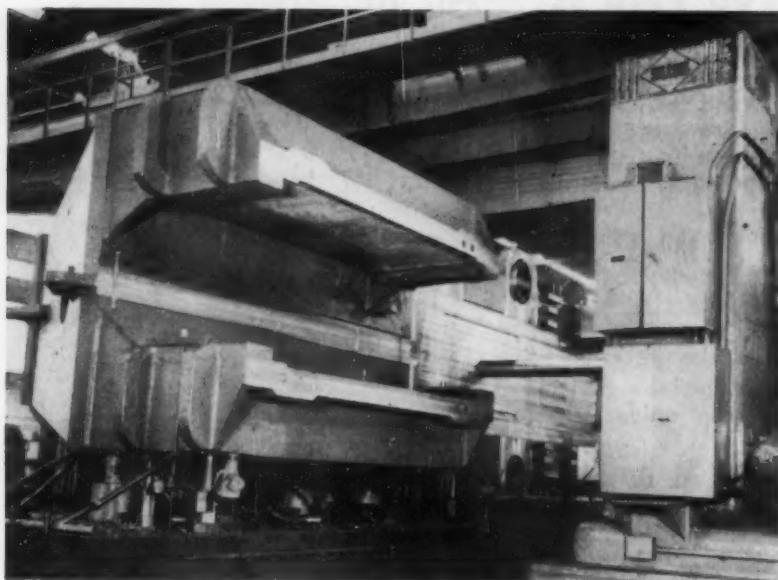
Own Patents—Practically every part or assembly in the King midget is individually patented under the names of the two inventors, even to the design of special tire treads. These tires, 5.50 x 8, are made by General Tire and Rubber Co. Only parts not patented by the manufacturers are the Timken bearings used in some assemblies.

"Scrap Is Where You Find It"—An Illustrated Guide

Winter is closing in on collections and sources of scrap iron and steel. Now the steel industry must more than ever put the stress on scrap to keep the openhearth going. Flow of auto graveyard scrap is being invigorated and industry continues to contribute its discarded dormant machinery and equipment which will be returned as new finished steel.

1. Railroads remain a prime source of good scrap steel.
2. In as wrecks, out as bundles.
3. Powerhouse gets set for melting into new steel.
4. Tin cans leave baler as bundles.
5. "We don't use it. Cut it up."
6. It won't rust in the furnace.
7. This bridge will carry a new load for defense's sake.
8. The last blow for this anvil.
9. These car wrecks go home.
10. All shops know this kind of industrial residue scrap.





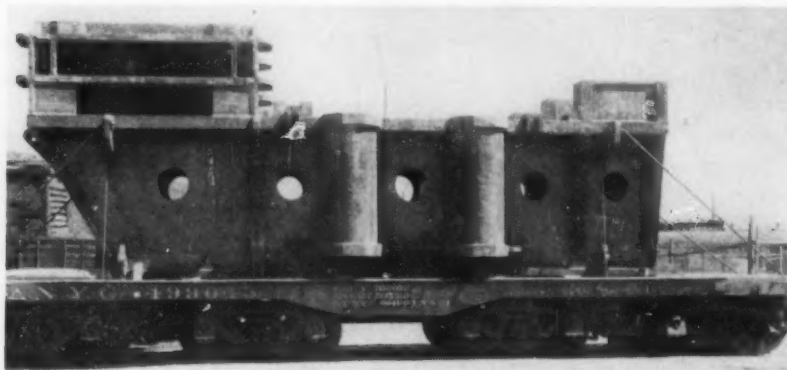
BIG BORE: Drilling knock-out cylinder hole. Boring and milling was done in one setup. Maneuvering the heavy base imposed new problems.

Jumbo Press for Aircraft Forgings

A big factor in expanding facilities to produce large aluminum and magnesium forgings for critically needed warplanes will be a massive hydraulic press shipped to Wyman-Gordon Co., Worcester, Mass. Verson Allsteel Press Co., Chicago, will send its engineers to Worcester to assemble the press and start it on its defense production role.

The press will have a capacity of 8000 tons on the main or vertical ram and 2000 tons on a side piercing ram. The 449,000-lb base for the press was shipped from the South Side plant of Verson Press Co. recently. Because of its size and weight, it went to A. O. Smith Co., Milwaukee, for annealing. A special flatcar of 500,000 lb capacity with four trucks and 16 wheels was supplied by New York Central Railroad for the hauling job.

Manufacturing a base of this size forced Verson into intricate problems of maneuvering the metal giant. All boring and milling operations were done in one set-up. Positioning the heavy base for machining had plant men thinking overtime.



SPECIAL LOAD: Base is loaded on a 500,000 lb railroad flatcar for shipping.

Convert Coal:

Plan large pilot plant to convert coal with carbonization process.

Pittsburgh Consolidation Coal Co. has contracted with the Chemical Plants Div. of Blaw-Knox Co. for construction of a large pilot plant to be used in partial conversion of coal, employing low temperature carbonization.

If the large pilot plant works out as expected, Pitt-Consol probably will be ready to build a commercial plant. Construction is expected to begin next spring, with completion expected during the third quarter of 1952.

Source of Data—Pitt-Consol expects the pilot plant to provide cost and design data for a commercial plant and production of sufficient quantities of liquids to permit commercial evaluation of the many chemicals and special carbons obtained by the process.

With the low temperature carbonization process, each ton of coal produces seven-tenths of a ton of high-BTU solid fuel or "char," about 37 to 40 gallons of tar liquid and some gas. The char is a high-grade boiler fuel, and the liquid when refined yields low-boiling tar acids, creosotes or feedstock for making carbon black and electrode carbons. The tar acids are used as chemicals and as intermediates by the plastics industry.

Trailer Production Rise Planned

Defense Production Administration is expected to approve a request for sufficient materials to increase second quarter truck-trailer production by 1500 units to a total of 16,000.

Boost has been approved by National Production Authority and Defense Transport Administration in view of the continued uptrend in highway freight traffic during last half 1951. This is expected to increase by another 10-15 pct before mid-1952.

Enough aluminum should be available for the 16,000 rate, control officials say.

QUOTAS: Civilians Will Be Jarred

Full force of defense production will be felt with start of 1952 . . . Defense and supporting industries will take 40 pct of steel supply, at least 60 pct of copper and aluminum.

Heavy impact of the defense program will begin to be felt in earnest with the start of 1952.

Beginning with the first quarter, Defense Production Administration reveals, defense and defense-supporting programs will get a minimum of 40 pct of carbon steel and at least 60 pct of the copper and aluminum supply.

Percentage of alloy steel to be allocated to direct defense and related production will run above 50 pct while about 60 pct of stainless output will be set aside for the program.

This was made clear last week with a DPA breakdown of first quarter allocations by categories.

Output—It is estimated that there will be a total carbon steel production—barring a strike—of 23,110,000 tons, including 2,300,000 tons of plate and 1,425,000 tons of structurals.

A total of 25,950,000 tons of carbon steels has been allocated including 2,578,000 tons of plate and 1,596,000 tons of structurals—on the theory that about 10 pct of the allocations will be unused.

First quarter estimated output, the total allocations, and tonnage for defense and defense-supporting production are roughly as follows:

Carbon steel—supply, 19,385,000 product tons; allocations, 21,780,000; for defense, related projects, about 9,158,760 tons, or 42 pct.

Carbon plate—supply, 2,300,000 tons; allocations, 2,578,300 tons of which 1,450,300 tons are for defense and supporting production, about 56 pct.

Carbon structurals—supply, 1,425,000 tons; allocations, 1,596,259 tons of which 1,056,000 tons or 66 pct are for direct and related defense.

Alloy steel—supply, 1,600,000 tons; allotments are 1,815,800 tons

of which 956,200 tons or nearly 53 pct are for defense and supporting.

Stainless steel—supply, 280,000,000 lb; allocations, 30,627,000 lb, of which 180,306,000 lb, or 59 pct, goes for defense and related.

Aluminum—estimated supply, 620,000,000 lb; allocations, 713,566,000 ingot lb of which 426,960,000 lb, or 60 pct, is for defense and defense related projects.

Copper wire mill products—estimated supply, 360,000,000 lb; allotments, 398,118,000 lb of which 225,925,000 lb or 57 pct, is allocated to the defense program.

Copper foundry products—supply, 290,000,000 lb; allocations, 322,012,000 lb of which 134,593,000 lb

or 42 pct are for defense and related production.

Brass Mill Products—No estimate of supply; 773,796,000 lb have been allocated with defense production getting 331,876,000 lb; defense related projects, 117,618,000 lb; and all other types of production getting 324,302,000 lb, or 41 pct.

Industry Controls This Week:

NPA Orders

NPA Reg. 1, Amend.—Places two types of carbon steel and three types of alloy steel under 45-day inventory ceiling. Nine other types of carbon steel are transferred from M-1 to Table 1B of this reg.

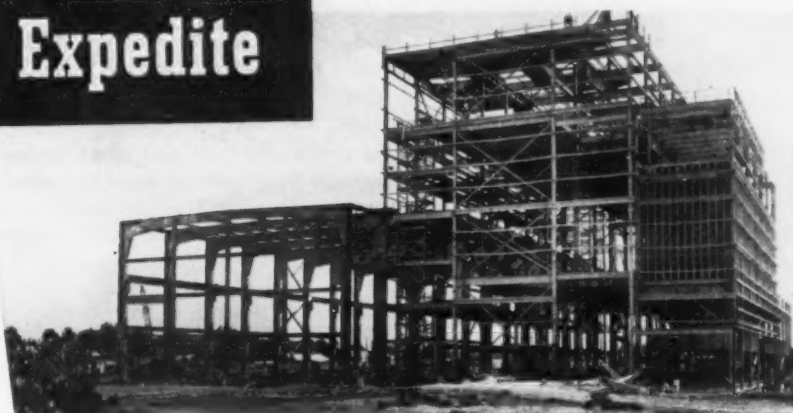
M-16, Amend.—Places all copper raw materials under NPA.

M-80, Sched. C.—Places specific restrictions on end uses of nickel.

OPS Orders

GOR 9, Amend. 11—Extends exemption from price control of sale, repair, and conversion of ships and barges until Feb. 13.

Expedite



Ingalls can expedite the construction of your power plant because steel is fabricated in one or more of its plants and delivered to the job by the shortest route from mill of origin ready to be built into the structure. Phone, wire or write us for assistance in expediting your power plant construction problems.

The Ingalls Iron Works Company

BIRMINGHAM, ALABAMA

SALES OFFICES: NEW YORK, CHICAGO, PITTSBURGH

why carry three spares when one can do the trick?



Years ago a motorist loaded down his car with plenty of spares. He had to. Tire design was such that blowouts were commonplace—and expected.

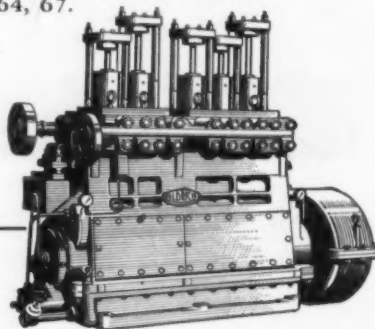
But look at the trim modern car! One spare is plenty—and it's seldom used.

Similarly, not so long ago a company had to stock three or more sets of spare parts to cover reciprocating pump needs. Today, the same company—by using Aldrich 5" Stroke Direct Flow Pumps—inventories but *one* set of spares to cover a 100 to 275 hp range.

Construction of Aldrich Direct Flow Pumps features wearing parts—valves, plungers, packing, crossheads, wrist pins, etc.—interchangeable within *each* stroke series. This covers 3, 5, 7 and 9 plunger units for the 5" series ranging up to 275 hp, or for the 6" series, from 300 to 900 hp. Rather than enlarge the stroke, Aldrich added cylinders to increase pump capacity.

To what advantage?—You benefit through interchangeability, fewer spare parts to tie up money and space, simplified maintenance, and better protection against shut-down . . . all made possible through greater standardization and improved design.

Applications where you'll find Aldrich Direct Flow Pumps saving maintenance time and dollars include: hydraulic systems for press operation; plastic and rubber molding and extrusion; steel mill descaling, and other uses in the petroleum and chemical industries. . . . Write for Data Sheets 64, 67.



THE ALDRICH PUMP COMPANY

8 PINE STREET, ALLENTOWN, PENNSYLVANIA

... Originators of the Direct Flow Pump

Representatives: Birmingham • Bolivar, N. Y. • Boston • Buffalo • Chicago • Cincinnati
Cleveland • Denver • Detroit • Duluth • Houston • Jacksonville • Los Angeles • New York
Omaha • Philadelphia • Pittsburgh • Portland, Ore. • Richmond, Va. • St. Louis • San Francisco
Seattle • Spokane, Wash. • Syracuse • Tulsa • Export Dept.: 751 Drexel Building, Phila. 6, Pa.

Controls

OPS to Watch Plane Spending

Government price stabilizers are making it clear that they intend to keep a sharp watch on Defense Dept. spending for aircraft and aircraft parts to compensate for the removal of these two categories from formal price controls.

Mike DiSalle, OPS chief, said last week he had reached an "understanding" with the Defense Dept.'s Munitions Board that gives him a greater voice in defense contract pricing policies. The "understanding" covers pricing policies on defense contracts covering all military equipment.

DiSalle warns that if the prices the government pays for aircraft parts are not held down to "reasonable" levels, he will reinstitute controls promptly.

The Defense Dept.-OPS agreements provides:

(1) OPS will collaborate with the Defense Dept. in reviewing defense contract pricing and repricing policies, procedures and practices for aircraft and other items purchased by the military at all procurement levels and will make such visits to military procurement offices as OPS deems advisable.

(2) OPS will recommend procurement pricing policies, procedures and practices which it deems essential to accomplish the objectives of the price stabilization program.

(3) The Defense Dept. will supply to OPS statistical data requested on procurement, prices paid and profit allowances, and other details of defense contracting.

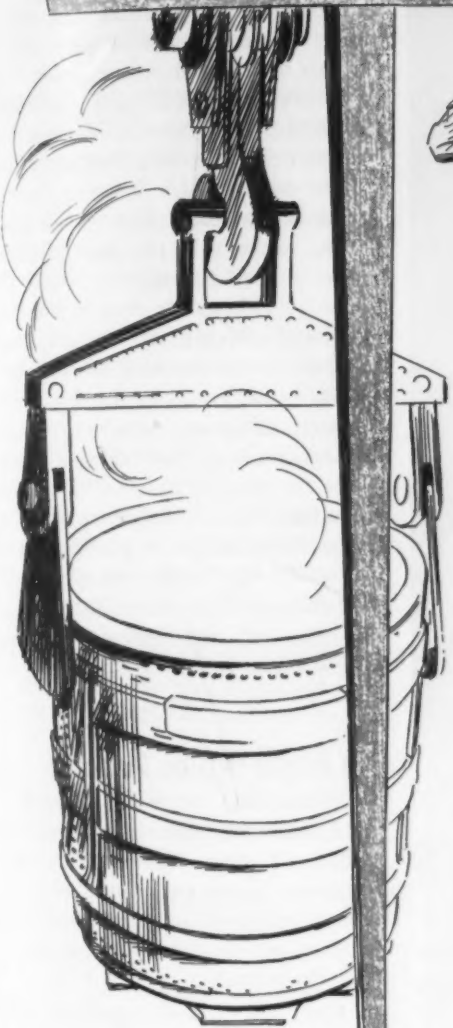
May Limit Fluorspar Use

An order is pending in National Production Authority which would limit the use of high grade fluorspar in manufacture of glass and porcelain enamels to 50 pct of the 1950 consumption.

Inventories of fluorspar would be limited to 45 days under the proposed order. Use of the ceramic grade fluorspar would not be restricted, however.

Another order along this line is expected to be issued providing

PLAY SAFE



FULL BORON EFFICIENCY with Grainal Alloys

Grainal is a more reliable means of making boron steels because the titanium, aluminum, zirconium and manganese in the alloy perform an important part of the treatment.

Grainal treatment is able to compensate for variations in oxygen and nitrogen contents of steel and for differences in finishing practice, thus effecting the proper treatment of steels by means of boron-containing alloys and providing constant benefit to properties.

Uniform results are obtained from one shop to another without the necessity of using identical steelmaking practices.

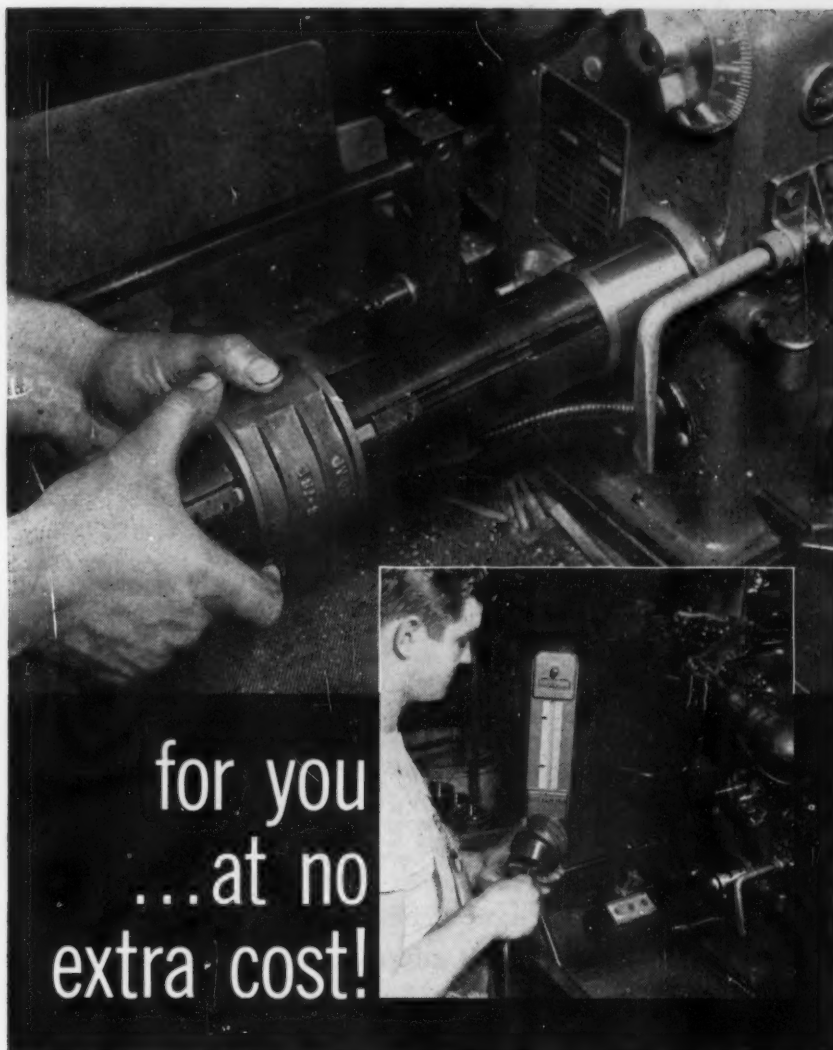
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Now, on every Buckeye air tool, cylinders are carefully honed to an exacting tolerance of just .0005" to provide greater contact area, insuring longer tool service life and lower tool maintenance costs.

From the 1" diameter cylinders in the compact, powerful Buckeye "A" Series, to the 2 3/4" cylinders in the husky Buckeye "F" Series, every cylinder is hardened and ground in the customary manner, then honed to mirror smoothness.

This extra production process, typical of Buckeye "Quality First," is just one reason why so many air tool users have found the best buy is Buckeye. If you're still choosing air tools by tradition or habit, better see what you've been missing—try Buckeye in your plant, without obligation.

Buckeye Tools
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Portable Air
and Electric tools
for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

Controls

that defense and supporting requirements for hydrofluoric acid and its derivatives must be fully met. It would limit other uses to 100 pct of 1950 consumption.

Given Alternatives on Pricing

Woven wire products and metal slide fasteners are among items which manufacturers may elect not to price under Ceiling Price Regs. 22 and 30. These CPRs became effective for most manufactured items on Dec. 19.

Slide fasteners and woven wire items are within the general products group covered by CPR 22. Also in this group and in line for optional pricing are paints, varnishes, lacquers, and plastic buttons.

Manufacturers have the option of postponing effective applicatory date for pricing under CPR 30 pole line hardware and line construction specialties; graphite crucibles; and scientific and laboratory glassware.

Office of Price Stabilization is in process of writing or revising regulations applying specifically to the items named.

To Advise OPS on Diamonds

Industrial diamond importers and manufacturers who advise the Office of Price Stabilization have named a 3-man subcommittee to aid the government in preparation of a dollars-and-cents price regulation for their trade.

Members of the subcommittee include Frank E. Koebel, of Van Itallie Corp.; L. H. Metzger, of Super-Cut, Inc.; William F. Mullins, of Werdiger & Mullins Co.

No License Plates for 1953

National Production Authority last week announced that new license plates for the nation's motor vehicles for 1953 are definitely out.

The control agency will allocate only enough steel, on a quarterly basis, during 1952 to permit manufacture of tabs, clips, and tags for new vehicles.

This means tags and clips for 52,000,000 vehicles and tags for

Controls

another 2,000,000 to 3,000,000 in new registrations for which owners will have no tags for transfer.

Savings of about 24,000 tons of steel and 400 tons of aluminum is expected. Not less than 18 states have voluntarily placed such a policy into effect for 1952, NPA said.

Uranium Salts Now Decontrolled

Uranium salts and oxides, sold under Atomic Energy Commission license, now are exempt from price control. Amendment 4 to General Overriding Reg. 3, effective Dec. 26, conveys authority for exemption.

Sales of the salts and oxides are valued at only about \$100,000 annually. Some are used as analytical reagents for research, while others have medical and glassmaking uses.

The same pricing amendment drops controls from sales of some fertilizer materials.

Central Used Rail Authority Asked

Members of the rail steel mill industry advisory committee have asked National Production Authority to place control of used rails under a single authority to make distribution quicker and more effective.



"New CMP allocations come out today, I see."

Noted auto maker USES Cincinnati WASHER

for "pre-plating" cleaning

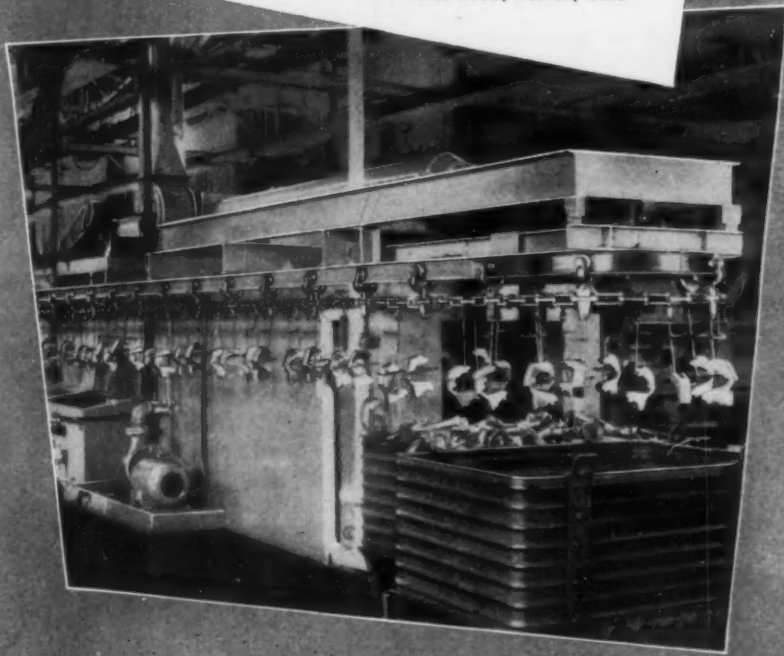
One of the "big-three" auto manufacturers, in one of its divisions, uses this Cincinnati Cleaning Machine to clean radiator grille brightwork before plating. Use of the Cincinnati Machine at this point in the production line graphically illustrates the effectiveness of this scientifically designed equipment.

In a remarkably compact machine, parts receive a one minute wash and a half-minute rinse before being carried on the plant monorail to the plating operations.

Significant savings . . . up to 50 per cent in time, materials and labor . . . have been reported by Cincinnati Cleaning Machine owners. For additional information or a no-obligation survey of your own cleaning problems, call in a Cincinnati engineer. Write today for free catalog.

Cincinnati ©

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"Using the Right Cutting Fluid Would Eliminate a Lot of Time and Money Wasted Changing Cutters"

There are literally thousands of examples to prove how the right application of the *right* cutting fluid can make a tremendous difference in machining efficiency. Here is another one which will help you realize the opportunities afforded by an open-minded look at your cutting fluids:

• **THE JOB:** Generator machining a 1" dia. worm gear, double thread.

COMPARISON OF CUTTING FLUID PERFORMANCE

	Previous Oil	Stuart's THREDKUT
Production per grind/dress	20 pieces average	190 pieces average
Finish	Passable	Satisfactory
Oil dilution	None	4 to 1
Cost of oil on machine	42c/gal.	27.2c/gal.
Downtime during test	2½ hours	None

Think of the increase in cutter life (cost about \$86.90 each). Before using Stuart's ThredKut they were reground 9½ times as often. Add to this the saving in downtime and the saving in cutting fluid price and you'll see why "Rudolph is Right."

Write for your copy of Stuart's Shop Notebook—a bi-monthly publication devoted to the selection and application of metal-working lubricants.



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Defense Contracts

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal, and opening date. Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q").

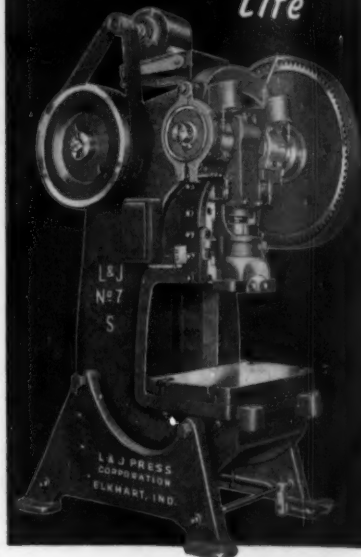
Navy Purchasing Office, Washington

Generator, tachometer, specifications MIL-P-6064A, 1525, 5659A-B, Jan. 16.
Bomb shackle-MK type with lick, 2667, 5665A-E, Jan. 21.
Torches, soldering, brazing, 936, 5670B, Jan. 11.
Grinder, plain cylindrical, 1, 2642Q, Jan. 15.
Shapers, openside, 2, 2637Q, Jan. 8.
Universal milling machine, 3, 2612Q, Jan. 3.
Shapers, vertical, 3, 2638Q, Jan. 4.
Machine, threading, cutting-bolt, 1, 2656Q, Jan. 14.
Lathes, with motors, controllers, 6, 2650Q, Jan. 14.
Hoists, with 3 ton chain fall-spur geared pulley, 40, 2661Q, Jan. 11.
Trucks, industrial, hand propelled, 66, 2670Q, Jan. 3.
Hammers, carpenters, curved claw, 30000, 5674Q, Jan. 4.
Shaper, Universal, 3, 2680Q, Jan. 3.
Spur gear, hand winch with mounts, 350, 4924S-B, Jan. 9.
Charger, battery, engine driven generator sets, 10, 2677Q, Jan. 10.
Grinder, cylindrical, 1, 3002Q, Jan. 7.
Machine, dishwashing, 72, 4917S-B, Jan. 10.
Bolts wrenching, 13650 ea, (40-604-52-54), Dec. 27.
Bolts, aircraft, 122900 ea, (40-604-52-54), Dec. 27.
Adapter, 1125 ea, (40-604-52-54), Dec. 27.
Bushings, 1085 ea, (40-604-52-54), Dec. 27.
Bracket assy, 1000 ea, (40-604-52-54), Dec. 27.
Screw machine, oval head, brass, 5000, 52-777B, Jan. 10.
Screw, machine, 10000, 52-777B, Jan. 10.
Screw, machine, flat hd., 15100, 52-777B, Jan. 10.
Bolt, lock assy, 8500, 52-894B, Jan. 10.
Guard assy, brush, radiator, 1250, 52-894B, Jan. 10.
Bolt, 210, 52-830B, Jan. 10.
Crankshaft, power tire pump, 150, 52-830B, Jan. 10.
Rivet, winch, drag brake lining, 4000, 52-830B, Jan. 10.
Arm, hand operated wiper assy, 150, 52-830B, Jan. 10.
Handle, hand operated wiper assy, 150, 52-830B, Jan. 10.
Washer, oil pump, 170, 52-898B, Jan. 10.
Screw, housing, governor, 800 ea, 52-898B, Jan. 10.
Screw, set, 10000, 52-777B, Jan. 10.
Screw, topping, slotted pan, 160000, 52-777B, Jan. 10.
Screw, topping, slotted, rd, 60000, 52-777B, Jan. 10.
Screw, machine, fl, hd., steel, 20000, 52-777B, Jan. 10.
Wrench, torque, 500, 52-912B, Jan. 10.
Tools, var, special to specification, var, 10012-12Q, Jan. 2.
Transformer, voltage, 135 ea, 11826-23Q, Jan. 2.
Sleeve, drivers, Daco Rivet Tool, 18 ea, 216-47-52, Jan. 3.
Bending machine, 1 ea, 216-47-52, Jan. 3.
Tester, torque wrench, 1 ea, 216-47-52, Jan. 3.
Cover assy, timing gear, 35 ea, 52-187B, Jan. 9.
Flywheel assy, 400, 52-187B, Jan. 9.
Head assy, cylinder, 525 ea, 52-187B, Jan. 9.
Lock, valve spring retainer, 6900 ea, 52-187B, Jan. 9.

U. S. Atomic Energy Commission, Los Alamos, New Mexico

Welded steel floor grating, 1 lot, 291-52-42, Dec. 28.

L&J PRESSES
for Longer Die Life



Exceptionally rigid frames; extra long gibs and large bearing areas, accurately machined, prolong die life. There's no guesswork about frame deflection in L&J Presses. A unique testing method measures the actual deflection of every design under load.

This is only one of the features of L&J Presses that contribute to economical, dependable production. It will pay you to find out more about them. Made in 6 to 80 ton capacities.

WRITE FOR LITERATURE



SPECIFICATIONS
NO. 7 BACK GEARED PRESS
(illustrated)

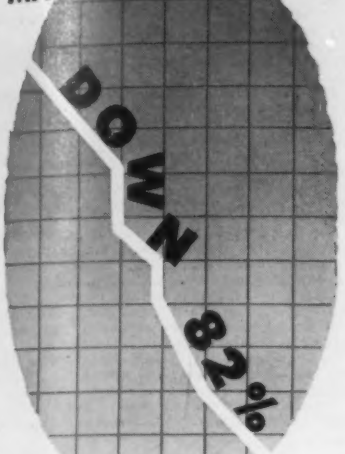
80 ton capacity, 4" standard stroke, 41 strokes per minute, 15-1/2" or 20" die space (bed to slide, stroke down, adjustment up), 38" x 24" bolster plate area L. to R. x F. to B., 12-1/2" throat depth, 17-1/2" opening through back, 15,000 lbs. net weight. Also available in plain flywheel type.

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MACHINING COSTS GO



when Michigan valve manufacturer switches to

ANTISEP ALL-PURPOSE BASE

The former coolant cost this company \$183.75 per month. Houghton Antisept A. P. Base, used 1 part to 20 parts water, cost only \$33.00 per month. This firm also reports a better finish is obtained, tool life is lengthened, and operators are better satisfied.

Antisept A. P. Base will handle better than 90% of your metal-cutting jobs. It is mixed as much as 1 part to 30 parts of plain water.

Use Antisept Base for general machining work... for automatics... for stamping and forming. You save space, write smaller inventories, simplify selection!

Ask the Houghton Man to arrange a convincing test on your tough machining operations. Or get further information by writing to E. F. Houghton & Co., Philadelphia 33, Pa.

GET THESE NEW BOOKLETS WITHOUT CHARGE



"Houghton Defense Production Data" is a factual record of heat-treating and machining experience in processing Shells, Cannon, Small Arms, Ammunition, Rockets, etc.—particularly valuable to plants switching to defense production. Write for a copy. The new 32-page booklet on Antisept Base, "Getting Down to Cases on Metal Cutting", will also be sent on request.

ANTISEPT ALL-PURPOSE BASE

High in Antiwelding Properties and Fatty Content

...a product of

HOUGHTON & CO.
PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO

Ready to give you on-the-job service...

Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address:

Spare parts, job, \$33,956, The Star Drilling Machine Co., Akron, Ohio.
Spare parts, job, \$38,984, Electric Machinery Mfg. Co., Minneapolis.
Cylinders, gas, 10000, exceeds \$250,000, Linde Air Products Co., New York.
Repair parts, 182 line items, \$14,740, Wagner Electric Corp., Los Angeles.
Automotive, repair parts, 407 line items, \$75,784, Reo Motors Inc., Los Angeles.
Automotive repair parts, 268 line items, Chevrolet Central Office Div. of GMC, Detroit.
Generator set, self-propelled, 10 ea, \$54,500, Hobart Brothers Co., Troy, Ohio.
Spares, data, kits for C-54-C-47 aircraft, exceeds \$250,000, Douglas Aircraft Co., Santa Monica, Cal.
Spare parts, \$81,910, Minneapolis-Honeywell Regulator Co., Minneapolis.
Stand assy., aircraft propeller, 63 ea, \$79,380, Bonell Machine & Tool Co., Cleveland.
T-6 propeller assy., 30 ea, \$25,500, Kindred Aviation Corp., Burbank, Cal.
Spare parts, exceeds \$250,000, Consolidated-Vultee Aircraft Corp., Fort Worth, Texas.
Lathes & grinders, exceeds \$250,000, Landis Tool Co., Waynesboro, Pa.
Spare parts, their equip, var, \$26,750, Michigan Power Co., Benton Harbor, Mich.
Spare parts, their equip, var, \$61,250, Linde Air Prod. Co., New York.
Spare parts, their equip, var, \$64,500, Austin-Western Co., Aurora, Ill.
Spare parts, their equip, var, \$190,000, Barber-Greene Co., Aurora, Ill.
Spare parts, their equip, var, \$41,000, Cummins Engine Co., Columbus, Ind.
Spare parts, their equip, var, \$26,000, White Motor Co., Cleveland.
Spare parts, their equip, var, \$77,500, United Motors Service Div., GMC, Detroit.
Crane, wheel mtd., tractor operated, 18 ea, \$81,250, R. G. Le Tourneau, Inc., Peoria, Ill.
Spare parts for tractors, \$36,500, Caterpillar Tractor Co., Peoria, Ill.
Spare parts for tractor, \$83,510, International Harvester, Melrose Park, Ill.
Compressor, air, exceeds \$250,000, Worthington Pump & Machinery Co., Chicago.
Compressor, air, exceeds \$250,000, Davey Compressor, Kent, Ohio.
Tank, asphalt, steel, trailer mounted, exceeds \$250,000, Vic Mfg. Co., Minneapolis.
Links, metallic belt, \$202,753, L. A. Young Spring & Wire Corp., Detroit.
Shot, RVP-T, 90MM, exceeds \$250,000, General Electric Co., Detroit.
Range finder, exceeds \$250,000, General Motors Corp., Detroit.
Maintenance parts, 6804 ea, \$79,341, The B. G. Corp., New York.
Maintenance parts, 5400 ea, \$25,630, The Goodyear Tire & Rubber Co., Inc., Akron, Ohio.
Pump assy, 160 ea, \$81,323, Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Pump assy, 160 ea, \$31,200, Chandler Evans Div., West Hartford, Conn.
Pressurizing valve, 160 ea, \$56,949, Bendix Products Div., South Bend, Ind.
Maintenance parts, var, \$48,729, Aircsearch Mfg. Co., Los Angeles.
Spare parts, 6040 ea, \$84,016, United Aircraft Corp., Hartford.
Propeller spare parts, 79025, \$175,652, United Aircraft Corp., East Hartford, Conn.
Spare parts, exceeds \$250,000, United Aircraft Corp., Hartford.
Maintenance parts, 59936 ea, \$39,425, United Aircraft Corp., Hartford.
Pipe, tubing, ingots, bars, angles, etc., exceeds \$250,000, Aluminum Co. of America, Washington.
Engine, spare parts, exceeds \$250,000, United Aircraft Corp., East Hartford, Conn.
Maintenance parts, exceeds \$250,000, Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y.
Cylinders, 644 ea, \$45,350, Lockheed Aircraft Corp., Greensboro, N. C.
Lead assy, 2000 ea, \$45,418, Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y.
Maintenance parts, 8858 ea, \$29,490, Breeze Corp., Inc., Newark, N. J.
Lead assy, 4860 ea, Breeze Corp., Inc., Newark, N. J.
Valve assy, var, \$129,664, Stratons Div., Fairchild Engine & Airplane Corp., Farmingdale, N. Y.
Antenna assy, 8918 ea, \$61,541, Jetronics Industries Inc., Philadelphia.
Flanges: drilled, 6700 ea, \$28,700, Western Forge & Flange Co., Santa Clara, Calif.

Automatic

"STRAIGHT-LINE" TEMPERATURE CONTROL

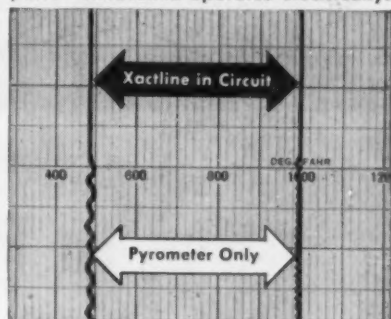
with
XACTLINE



ELIMINATE
Overshooting
Undershooting

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Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw-tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required—any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

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—Defense Contracts—

Carriage, motor, exceeds \$250,000, American Car & Foundry Co., New York.
Gun, twin 40MM, self propelled, exceeds \$250,000, American Car & Foundry Co., New York.

Pumps & repair parts, 1647, \$30,780, Northern Ordnance Inc., Minneapolis.
Repair parts for elec. motors, 1932, \$26,716, Elliott Co., Philadelphia.

Repair parts for pumps, 1972, \$51,333, Ingersoll Rand Co., Philadelphia.

Repair parts for elec. control equip, 29103, \$90,071, Ward Leonard Elec. Co., Mount Vernon, N. Y.

Repair parts for diesel engines, 38660, \$121,947, Cummins Engine Co., Columbus, Ind.

Special bearings, 1 ea, exceeds \$250,000, Kaydon Engineering, Muskegon, Mich.

Disc. steel, for case cartridge, 3 ea, exceeds \$250,000, Armco Steel Corp., Middletown, Ohio.

Shell, shotgun 401 gauge, 1 ea, exceeds \$250,000, Western Cartridge, East Alton, Ill.

Tube forgings for 76 MM gun, exceeds \$250,000, National Forge and Ordnance Co., Warren County, Pa.

Turret body, cast, exceeds \$250,000, Union Steel Castings Div. of Blaw-Knox Co., Pittsburgh.

First Large M1 Contract Awarded

International Harvester Co. has scheduled delivery for early 1952 of the first of a multi-million dollar order of M1 rifles, contracted for by Army Ordnance Corp.

Tooling for production is underway at the company's Evansville, Ind., plant. An estimated 1500 workers will be needed when production is at its peak.

First Since War—The large rifle contract is the first of its type since World War II. Production was discontinued at the close of the fighting, because an ample supply was on hand. Limited spare parts manufacture was continued.

In recent years the time required to mass-produce the M1 has been reduced. The rifle itself has been changed, notably by the addition of a sight which permits rapid aiming and firing.

York Gets \$1 Million Army Order

A \$1 million Army contract for 90-mm gun breech rings has been awarded to York Corp., York, Pa. Contract was granted by the Philadelphia Ordnance District for the Watervliet, N. Y., Arsenal.

About 130 persons will be employed on the breech ring contract. New tools and equipment are now being ordered. Production of the rings is not expected to interfere with the company's regular output.

York has revealed it now has several defense contracts not related to air conditioning and refrigerating equipment.

This Week in Washington

Try to Figure Wage Hike for Labor

Officials still hope a strike can be avoided . . . WSB willing to grant a 6¢ increase . . . Truman to ask higher taxes . . . No FTC ban to be put on functional discounts—By G. H. Baker.

Washington observers who have interpreted all statements (public and private) of interested officials aren't able to come up with any set of figures that indicate the steelworkers will get anything like the wage increase they are demanding.

Yet federal officials closest to the government-labor-industry

culated under the Capehart higher-cost provisions. Whether Murray heeds this is debatable.

Some sources here believe the possibility of an actual walkout on Jan. 1 has heightened considerably within the past few days. Others say only calling in the Taft-Hartley 80-day strike suspension law will avert a strike. Top government officials are in thorough accord with the industry in that "there must not be—there cannot be—a stoppage of production."

Higher Taxes—Within the next few weeks (probably by Jan. 15) President Truman is expected to make known his specific demands for new and higher taxes.

Both Mr. Truman and John W. Snyder, Secretary of the Treasury, have thus far maintained a dis-

For more details of Washington efforts to head off the scheduled steel strike, see p. 21.

mediation meetings of the past 10 days still hope the way can be cleared for settlement of the threatened strike. Ostensibly this would involve some figuring that hasn't yet come to light. It may happen after a strike.

How It Figgers—Insiders at the wage parleys being conducted here this week by Cy Ching, head of Federal Mediation Service, look at the "deadlock" this way:

Phil Murray and the USW-CIO have presented wage demands which amount to an average hourly wage increase of 15¢, plus fringes. Wage Stabilization Board is willing to approve up to 6¢ worth of this demand as being compatible with its formula.

At this point, Mike DiSalle, Price Stabilization Chief, is cued to enter the bargaining room with the announcement that federal price-fixers have succeeded in rejiggering the Capehart Amendment around to the point where another 3¢-5¢ per hr may be added to the Murray package as a result of slightly higher steel prices cal-

creeet silence as to the extent of their forthcoming demands for more federal spending money.

However, there is no secret that a new bid for a still-larger slice of John Q. Public's purchasing power is about to be made.

Mr. Truman made this clear only a few weeks ago in a statement issued in connection with his approval of the \$5,000,000,000 tax bill passed by Congress.

Close Loopholes—"I shall urge the Congress at its next session to give major attention to legislation improving our tax laws," Mr. Truman said in a thinly-veiled hint at that time.

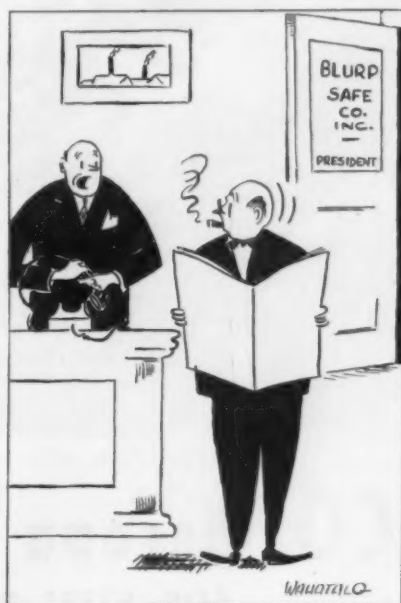
It is believed in some government circles that the White House will ask Congress to close some of the so-called loopholes in the present tax structure. The depletion allowances fixed by a number of mining industries probably will be singled out for assault by the Administration.

In addition, look for another request for federal (compulsory) withholding of dividend taxes.

Delivered Prices—Federal Trade Commission again is seeking to regain some of the prestige it lost during the period in which it was unable to make up its mind about the legality of delivered prices.

James M. Mead, FTC chairman, flatly denies that the commission is seeking to outlaw functional discounts granted by manufacturers. "As chairman of the commission, I have no thought of attempting any such action," he states.

To End Rumors—Mead's statement is seen as an attempt to knock down reports that FTC is trying to end all functional pricing in so far as subdistribution (distribution by sub-jobbers) is concerned.



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STEEL: Jack Up Goals for Capacity

Washington now wants 123 million tons of capacity by Jan. 1 1954 to make 120 million tons of steel . . . Goals for attendant facilities boosted . . . Push taconite — By Karl Rannells.

Government's new official goal for primary steel capacity is now set at 123,000,000 tons annually. Target date is Jan. 1, 1954. Estimated annual net production desired is 120,000,000 ingot tons.

Defense Production Administration last week confirmed an earlier report by THE IRON AGE (Aug. 30, 1951, p. 87) to this effect. It announced that no more tax amortization certificates would be granted, since expansion plans are now geared for this figure.

The government has also set capacity goals for supporting programs as follows: Blast furnaces, 85,000,000 net tons; byproduct coke ovens, 84,000,000 tons; and taconite beneficiation capacity, 15,000,000 gross tons.

Scrap Some Capacity — Tax-amortization certificates for new steel capacity have been issued to date for capacity of 23,000,000 tons, to be added to the 100,000,000 tons capacity as of July 1, 1950.

Some present capacity will become obsolete and will be scrapped in the next few years. And DPA admits there is no assurance that all tax certificates already issued will be used.

But the agency had no comment as to whether additional tax certificates would be issued to replace any such cancellations. Presumably it would, since it feels that the 123,000,000-ton figure is necessary "to assure an effective production of 120,000,000 tons a year."

As of Dec. 1, 1951, National Production Authority estimated blast furnace capacity at 81,900,000 net tons. This must be increased by a minimum of 3,100,000 tons by 1954, DPA says.

This figure takes into account pig iron and castings, but does

not include ferroalloy capacity. It is only tentative, however, in view of the current scrap shortages. If present scrap collection rates cannot be boosted and maintained at a higher rate, provision will be made for additional blast furnace expansion.

More Coke—Beehive coke production is expected to be maintained at about the present level of up to 8,000,000 tons. This means that capacity of byproduct coke ovens must be expanded by some 10,000,000 tons over pre-Korean figure in order to reach a 1954 goal of 84,000,000 tons.

Limestone and solomite quarry expansion is being—and will be—approved in proportion to expan-

sion of blast furnace capacity. This same principle will be applied to expansion of mining and washing facilities for metallurgical grade coal in connection with the coke oven program.

It is flatly predicted by DPA that ore output from the Mesabi Range will start dropping sharply about 1956. Until that date, the agency says, enough iron ore appears to be in sight to take care of expanding steel production.

However, as insurance against a deficit after that date, the government has set a production capacity expansion goal for beneficiating Mesabi taconite at 15,000,000 gross tons of usable ore. This means that facilities must be constructed to process something like 45,000,000 tons of taconite annually.

The reason for picking 1956 as the target date for the taconite plants is that DPA estimates that the facilities cannot be completed under 4 years. It may run into trouble in selling the programs.

Taconite Security—The taconite beneficiation expansion will be pushed by the government, however, regardless of the development of the Labrador, Venezuela, and other foreign iron ore fields. The reason: In case of war, overseas supply lines might be cut off, thus making it a matter of national security.

It is estimated that it would cost the steel industry about \$500,000,000 to build the necessary beneficiation facilities. This includes construction of any necessary new docks and ore boats that are not already available.

Government planners admit that the beneficiation processes have not yet been fully proved and are not much past the pilot plant stage. But they intend to press for program completion.

DPA has already authorized amortization certificates for such projects. By implication, it will also authorize whether other aid is necessary in order to get its program completed by its target date of 1956.



GOING UP: Republic Steel Corp.'s No. 6 blast furnace nears completion in Cleveland. Capacity when finished will be 1470 tons per day.

Industrial Briefs

Galvanizing—Construction will start soon on a new \$2.5 million continuous galvanizing mill for WHEELING STEEL CORP. at Martins Ferry, Ohio. The new mill will be known as Martins Ferry No. 2.

New Sleepers—Chicago plant of Pullman-Standard Car Mfg. Co. will build 22 new sleeping cars for THE LOUISVILLE & NASHVILLE R.R. CO. Cost of the new cars will be about \$3,660,000.

Grand Opening—TENNESSEE COAL, IRON & R.R. CO. held "open house" at its new \$6.5 million office building at Fairfield, Ala., last week when the public was shown through the structure.

Elected—At a recent meeting in New York, L. West Shea, The Union Metal Manufacturing Co., Canton, Ohio, was elected president of THE MATERIALS HANDLING INSTITUTE, INC.

Export Representative — Eastern Stainless Steel Corp. has announced the appointment of INTERNATIONAL SELLING CORP., New York, as its exclusive export representative.

New Line—ORAL T. CARTER & ASSOCIATES, INC., is manufacturing a complete line of conveyor equipment and machinery, known as Carter "Black Velvet" conveyors. All bearings and working parts are treated with a deep penetrating oil to insure a salt lubricated operation.

Changes Name—Charles H. Besly & Co. will change its corporate title to BESLY-WELLES CORP. on Jan. 1. No changes in personnel or production facilities are involved.

Trade Association—A new trade organization, ASSN. OF BEARING SPECIALISTS, has been incorporated in Illinois. Membership is composed of firms whose primary purpose is supplying ball and roller bearings for industrial maintenance.

Moving—RICH & PROCTOR STEEL CO. is shifting its warehouse and offices from San Francisco to 841-73rd Ave., Oakland, Calif., in January.

New President—Richard P. Swartz, president, Crown Can Co., Philadelphia, was elected president of CAN MANUFACTURERS INSTITUTE at a meeting of the board of governors in New York recently. He succeeds Ralph C. Rosecrance, J. L. Clark Mfg. Co., Rockford, Ill.

Design—Leading machine designers will compare notes on defense production at the NINTH ANNUAL MACHINE DESIGN CONFERENCE to be held Feb. 4 at the Cleveland Engineering Society, Cleveland.

Slidefilm Offered—General Electric Co. now has available for showings a 12-min black-and-white, sound slidefilm on PROTECTIVE MAINTENANCE.

Appoints Representative—GRAHAM-MINTEL INSTRUMENT CO., Cleveland, has appointed Harry R. Berkshire to handle its electronic gaging equipment throughout greater New York and adjacent territory.

Public Relations—A district public relations office will be established in Louisville by U. S. STEEL CORP. on Jan. 1. In addition to general public relations work for U. S. Steel, the new office will handle work for company subsidiaries in the area.



Recent Occupancy — KAIGHIN & HUGHES, INC., Toledo engineering firm, recently occupied a new \$200,000 headquarters building at Atlantic & Spencer Streets in Toledo.

Sales Representative—John P. Cleveland has been appointed Indiana sales representative for Soss Invisible Hinges, made by SOSS MFG. CO.

Distributor Appointed — Daniel G. Hereley Co., Chicago, has been appointed distributor of MD Aluminum Pastes & Powders and MD Gold Bronze Powders by METALS DIS-INTEGRATING CO., INC., Elizabeth, N. J.

Expands—PHILCO CORP. will establish a factory branch in Los Angeles effective Jan. 1. New facility will be known as Philco Los Angeles.

Increase Output—PENNSYLVANIA SALT MFG. CO. will increase production capacity for synthetic anhydrous ammonia by 110 pct at its Wyandotte works. The new facilities will cost an estimated \$2.2 million. Construction will start early in 1952.

New Office—New offices and warehouse facilities at 1234 S. Aurora St., Stockton, Calif., have been opened by TAY HOLBROOK, INC.

Arranges Loan — WESTINGHOUSE ELECTRIC CORP. has arranged to borrow \$250 million, with an option for an additional \$50 million, from a group of institutional investors. The loan will finance the company's \$296 million expansion program and provide necessary working capital for an increased volume of business.

Distributor Named—Carl E. Swift has been appointed exclusive distributor in Southern California, to jobbers of the standard line of perishable metal cutting tools and also special tools for the FALCON TOOL CO.

Names Rep.—V & O Press Co., division of Emhart Mfg. Co., has appointed the BRYANT MACHINERY & ENGINEERING CO. of Chicago, as representatives for their complete line of Precision Power Presses, Roll Feeds and Feed-O-Matics in that area.

War Baby grows into a Clock Case

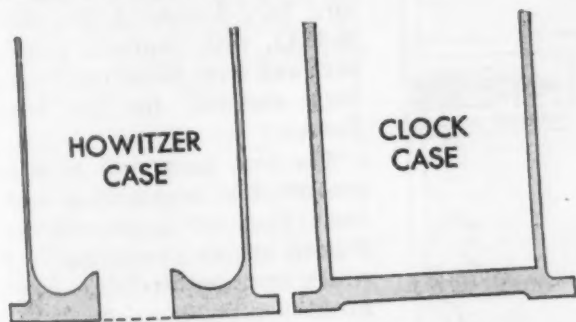
During the War, the Worcester Pressed Steel Co. worked out a technique for forming 4.5 howitzer shell cases of cartridge brass. The case was 3 $\frac{3}{4}$ " high, 4 $\frac{1}{4}$ " o.d., with thin walls and thick base that included a difficult flange, the material for which had to flow entirely from the base of the cup. The successful solution of the many problems required careful tool design, plus skilled control of each operation.

Later the Chelsea Clock Co. asked Worcester if it could cold-form clock cases out of commercial brass. A study of the clock case revealed striking similarities between it and the howitzer case, but on the other hand there was one important difference. The large radius on the inside of the howitzer case was not permissible in the clock case, because of the space required for the works. It was found that the bottom design could be achieved by squaring the case to the exact height, providing the bottom knockout with exactly the correct amount of spring tension in the restrike, and carefully governing the pressure and speed of press travel. The complete coordination of these factors resulted in a perfect case, and another example of the adaptation of war-learned skills to peace-time products.

• If you have problems in connection with the fabrication of copper and its alloys, or aluminum alloys, remember that the Revere Technical Advisory Service often can be helpful.



Chelsea Ship's Bell Clock, The Vanderbilt model, made by Chelsea Clock Co., Chelsea 50, Mass. Case drawn in one piece out of commercial brass by Worcester Pressed Steel Co., Worcester 6, Mass.



Cross sections showing similarities and differences between the howitzer case and the clock case.

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The Automotive Assembly Line

Switch to Plate May Hit Automakers

Light gage steel may be sacrificed for more plate capacity . . . Auto output down in year-end lag . . . Customers are balking at car prices . . . Layoffs continue—By W. G. Patton.

Detroit is asking itself whether the auto industry will again be sacrificed in order to straighten out the badly confused steel situation. Demand for steel plate is terrific. Some light gage steel has recently been diverted to plate. Easier availability in light gage steel might, as some observers see it, disappear rather quickly if too much light gage tonnage is changed to plate.

Some of the Washington planners are known to favor a system involving approval of all rolling schedules on plate mills. Such a system is used for alloy steel. The detail work involved in supervising plate rolling schedules would be tremendous.

Output Lag—A year-end tapering off is occurring in automobile production. Inventories, new models and, in some instances, customer resistance have resulted in reduced vehicle production schedules.

According to *Ward's Reports*, Chrysler output was down 1000 units last week. Ford dropped 4000 units. Studebaker and Hudson, getting under way with new 1952 models, reduced production by 2500 cars.

Ward's predicted the industry will not reach the 1,100,000 quota permitted by NPA during the fourth quarter. The statistical agency estimated 1,066,000 cars will be completed. However, each of the Big Three will equal its NPA allotment, Ward said.

Too Much—Customer resistance to higher car prices is growing. Surveys recently completed show

dealers' stocks are up. Compared with inventories a year ago, the number of unsold cars is low. However, increased prices of cars have increased the dollar value of dealer stocks.

Car prices have not risen under the Capehart Amendment as many observers anticipated. Biggest retarding factor is buyer resistance to higher prices. In part, the auto sales decline is seasonal. Each year December and January sales have been slow. With higher prices anticipated in 1952 and comparatively few major model changes, the industry will have to fight for sales next year.

Out of Work—Latest figures show that during December 30,630

persons were receiving unemployment compensation in Wayne County. This is an increase of about 6600 compared with a month ago and is approximately three times as high as a year ago.

Past experience shows the number of persons receiving unemployment compensation is not so great as the number of workers out of jobs. Upwards of 100,000 are unemployed at present in the Detroit industrial area. Some estimates place the unemployed at more than 150,000.

Prospect is that employment will hold close to existing levels during the first quarter of 1952. While it is anybody's guess, a slight increase may come during the second quarter. Political observers feel that during 1952, an election year, every effort will be made to hold employment at the highest possible level.

New Jeep—Another large order for the production of military Jeeps and spare parts has been received by Willys-Overland Motors, Inc., Toledo. A new model, M-38A1, with improved performance and more riding comfort, has been designed for the Armed Forces.

The new Jeeps will be waterproofed for deep-fording operations. They will be powered by an F-head engine developing 72 hp which operates at 7.4 to 1 compression ratio.

New Engines—According to a recent release by the Office of Price Stabilization, Willys will offer both a deluxe "L" head and an "F" head in its new passenger car line. The "L" head is base-priced at \$1718. The deluxe "F" head is priced at \$1950. The custom "F" head sells for \$1984. Each of these prices is f.o.b. factory. The customary retail markup must be added to this price.

Turn Page



PARTS: Hardy Committee Too Rash

Claims of overcharging denied by all concerned . . . GM makes only 6.9 pct on government sales . . . Some lose money . . . Car-makers say U. S. gets best prices . . . Rap high packing costs.

Difference between what is turned up by headline-hunting Congressional Investigating Committees and the actual facts is sometimes startling.

Last week the Hardy committee was in Detroit investigating spare parts procurements by the Ordnance Tank-Automotive Center. The committee made headlines with a charge that certain sales practices of the auto industry have swollen defense costs by \$305 million.

Too High—Testifying before the committee Gen. Carl Deitrick, new commanding officer at TAC, said the committee's claims should be discounted by at least 42 pct.

Myrle E. St. Aubin, director of service section, General Motors Corp. said that during the first 10 months of 1951, GM sales to all government agencies totaled \$7,707,000 but gross profit was only 6.9 pct of sales. While GM did not lose on these transactions, St. Aubin said, United Motors Service Div. sustained a loss.

Special Wrapping—F. W. Misch, assistant controller of Chrysler Corp., said Chrysler never "knowingly charges the government more than the lowest price it charges any other buyer of like quantities, and often charges it less." Misch claimed the committee's estimate of 10 pct as the basic cost of packaging for the government is "unrealistic." Based on the first 10 months of 1951, he said, the actual packaging cost on government items to Chrysler was 23 pct. Sometimes, he indicated, the cost of packaging special items is greater than the cost of parts.

The Hardy committee not only charged the industry with "double-profits" but with an unwillingness to deal with the gov-

ernment. The auto industry's answer was that if the government can buy the same parts at a lower cost through other sources it should certainly do so. The industry is unwilling to upset a basic distribution system it has used for many years.

Studebaker Adds Hardtop

Studebaker has added a "Starliner" five passenger, hardtop convertible to its 1952 line of Champions and Commanders.

A major change in Studebaker is a new front-end treatment which eliminates the former airplane motif. The front grille has been restyled. Vertical bars are spaced far apart. Massive wrap-

around bumpers are equipped with four vertical guards; two are located under the headlamps and two smaller guards protect the license plate from damage.

New Look—Changes have been made in brake linkage. Floating rear shoes are employed for all brakes. The new liners give greater resistance to "fading."

Studebaker's V-8 engine is unchanged. Heat-resisting, glare-reducing glass for windshields, side and rear windows is optional on all 1952 models. Rear view visibility is greatly increased. Automatic transmission, overdrive, hill-holder and one-piece windshields are continued.

Additional specifications of Chrysler's powerful K-310 experimental model became available this week. The new experimental car, 59 in. high is built on 125½ in. wheelbase. Overall length is 220½ in. The car has full head room and a long, low flat hood. It has 17-in. wire wheels and narrow tires (for better brake and tire cooling.)

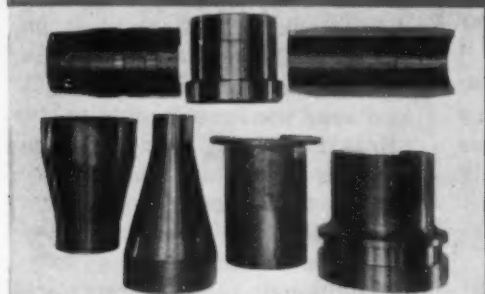
THE BULL OF THE WOODS

By J. R. Williams





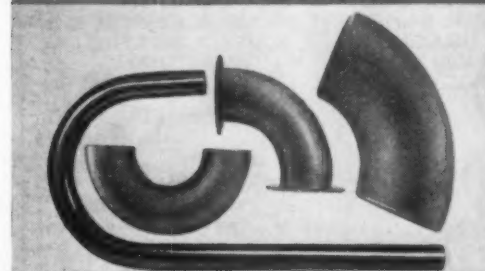
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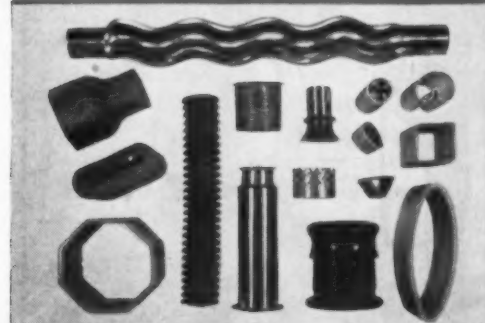
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TA-1641-M



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Wreckers Not Unhappy Over M-92

Most complaints are from small operators who have misread the regulation . . . Would barter scrap rails for structurals . . . Find monazite deposits in Idaho — By R. T. Reinhardt.

While there are some strong exceptions, it appears most western auto wreckers aren't too unhappy over NPA's order to dispose of pre-1946 automobiles.

Most violent protests come from small operators and generally are based on incorrect interpretation of the regulation. A spokesman for a large segment of western members of the National Auto Wreckers Assn. told THE IRON AGE:

More Practical — "This NPA order, like any order affecting any business, isn't desirable, but we think it offers the most effective method of getting needed scrap to the steelmakers. It is certainly a more practical plan than that used in World War II when valuable parts were destroyed."

Competent observers believe that western wrecking yards will have cleaned out all cars covered by this regulation within 6 months. How many tons of scrap this will produce in the seven western states is anybody's guess. However, optimists expect about 200,000 tons will be developed in the next 6 months. It isn't hard to find estimates 50 pct lower.

Tit for Tat? — Public Works Dept. of San Francisco wants to get tough about its inability to get steel for school buildings and firehouses.

Having released about 20,000 tons of scrap street car rails to the market within the past couple of years, the city feels it should be given some consideration on its demands for structurals. To emphasize the point, Sherman P. Duckel, public works director, plans to stockpile rails recovered in the future for barter. Some 600

tons is expected to be taken up within a month or two, and an estimated total of 14,000 tons of abandoned track remains. It is implied that the extent of new steel allocation to the city by the government will have a bearing on how fast those rails are removed.

Monazite Find — Commercial quantities of monazite have been reported in the Cascade Basin of west central Idaho by state mine inspector George McDowell.

This phosphate of the cerium metals is in demand for special alloys needed in military aircraft and has been imported from Brazil and India. The processing of the monazite may also make available commercial quantities of ilmenite for titanium production.

New Scrap Yard — Bethlehem Pacific Coast Steel Corp. will have a smoother flow of scrap to its electric furnaces in Los Angeles with the establishment of a yard by Lippset Co. of New York almost across the street from Bethlehem's plant.

Lippset has leased property re-

cently purchased by Bethlehem from Baker Oil Tool Co. at Slau-son and Boyle Aves.

Subs Close to Home — A check of the 249 subcontractors supplying Boeing Airplane Co. at Seattle shows that 132 are located within the Pacific Northwest area, and of these the majority are in the Seattle area. Most of these firms range in size from five to 250 employees with but few approaching the 500 employee level. Boeing work in these shops ranges from more than 90 pct to as little as 20 pct of total volume.

Why Build a Bridge? — Salvage of obsolete bridges isn't new, but the present shortage of structurals has stepped up interest in moving stream crossings from one place to another.

It isn't the initial cost of the bridge that's important—it's the dismantling and erection which mounts up. This month Chelan County, Wash., purchased a 390-ft steel struss span from Spokane County and is paying Roy L. Blair Co. of Spokane \$53,910 for dismantling and re-erection over the Wenatchee River north of the town of Wenatchee. High bid for the job was \$113,242.

It Costs Money — Bigger, faster and longer range bombers cost plenty of the taxpayers' money in themselves, but their development produces fringe needs which run into the millions.

As an example, when Boeing Airplane Co. wheeled out its first XB-52 last month it was a symbol of the need for the more extensive runways at the King County, Wash., airport which now have been increased to almost 2 miles to accommodate this air giant. That pattern will be duplicated throughout the country.

About \$4 million will be spent to provide new hangar facilities alone for the B-52 program at Seattle and that's just a start.



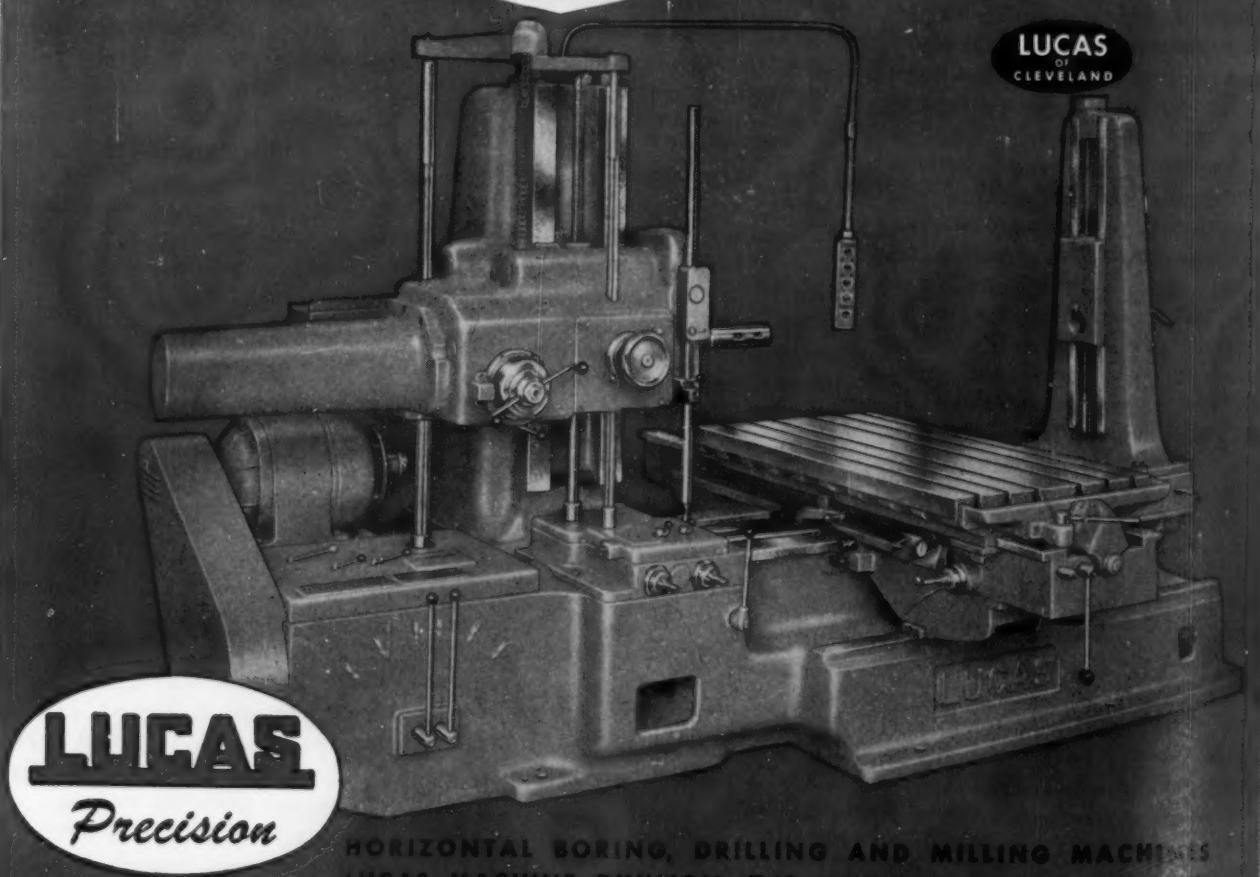
ed. Money

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Machine Tool High Spots

Machine Tool Exports Lose Ground

The Iron Age annual statistical roundup shows tool exports slipping below 1950 . . . Detroit may build own tools for new engines . . . Small extra load for aircraft — By G. Elwers.

Machine tool exports in 1951 will total slightly less than those of 1950. Data collected for the statistical section of THE IRON AGE annual review issue show that, if the export rate of the first 7 months holds, 1951 machine tool exports will be \$63 million. Exports in 1950 were almost \$66.5 million.

Automatic lathes, and milling machines other than the knee and column type, are the leading types of tools exported this year. Exports of both these types of machines will show a higher volume than last year. Boring mills and turret lathes, which were both among the types leading the export list in 1950, have both declined substantially in dollar volume this year.

Engine lathes and automatic screw machines are also among the types of machine tools comprising major U. S. exports.

Best Customer—Canada is the biggest foreign buyer of U. S. machine tools in 1951. The United Kingdom stands second, closely followed by France. Italy is fourth. South America is a poor fifth, purchasing in 1951 a dollar volume of machine tools only about half of each of the four leading buyers.

Emergence of Canada and the United Kingdom as the biggest U. S. customers is a switch from most post-war years. France and Italy have led the list in the last 3 years.

Zero to Russia—In 1945, 1946, and 1947, Russia was our largest customer. Exports to Russia

dropped off drastically in 1948 and slid to zero in 1950.

Exports to South America, Canada, and the United Kingdom will show large increases this year over the volume shipped to these areas last year. In each case, the totals bought by these customers in the first 7 months of 1951 are about equal to or already exceed their purchases in all 1950.

Declines during 1951 are shown in exports to Europe exclusive of England, France, and Italy. Substantial declines are also found in 1951 shipments to Asia, exclusive of Japan, and to Central America.

New Engines—Detroit's determination to complete tooling for new engines if at all possible is shown by Chrysler's Dodge Div.,

which intends to build some of its own broaching equipment. The designs are those of the Cincinnati Milling Machine Co., from whom the machines had been ordered. (See p. 22.)

Indications are that Cincinnati will only be able to complete one of the machines; and that Dodge will try to build the others itself.

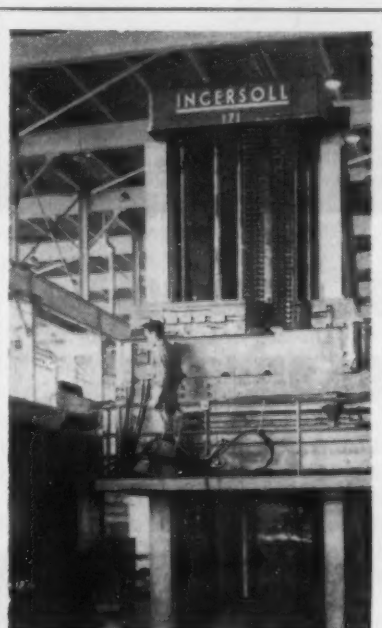
Small Extra Load — Because Congress will probably give the Air Force funds to construct about a 140-group Air Force instead of the 95-group goal which had been set does not mean a large additional load on the machine tool industry.

Raising the goal for the eventual Air Force size will not mean trying to increase the rate of aircraft production, an NPA spokesman has said.

But this does not mean that there still aren't many machine tools yet to be ordered for aircraft production. Orders from the aircraft industry will bulk large in the total of \$1.5 billion in machine tools expected to be ordered between now and the end of the fiscal year.

Orders Where?—It appears that three firms will share most if not all of the orders for large-swing lathes with cross, or T, beds. This type of machine is much in demand in jet engine production, which requires machining of many large-diameter rings.

Lodge & Shipley, LeBlond, and Monarch will probably share most of this business. First guesses that over 2000 of these lathes would be ordered now appear to be too high. For one thing, the expected volume of orders from abroad has not materialized. It was expected that large numbers of these lathes would be ordered by British jet makers. Now it is reported that they intend to buy, instead, mostly German versions of the same type of lathe.



BIGGEST: The largest Ingersoll horizontal milling and boring machine yet built starts fabricating the bed of an E. W. Bliss Co. stamping press.

Finishing Problem?

Black & Decker Sanders and Polishers have solved them for thousands of plants, shops!



B&D Sanders drive attachments for sanding metal and wood; grinding down welds and casting ridges; cleaning castings, structural steel tanks, boilers, vats, sheet metal and soldered joints.

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The Iron Age

SALUTES

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MENTION progress in New England and the name Blackall is bound to come up. That's because Frederick Blackall is a leader in the hard core of enlightened management that is determined to keep industry in that area—and make its climate healthy for growth.

He doesn't believe in change for the sake of change. But he strives constantly for progress, and he recognizes that progress and change often go hand in hand.

Like the time in 1946 he headed the Technical Mission of England on unification of Anglo-American screw threads. It was, in many ways, a thankless and unsensational task; yet it was most difficult, requiring a neat job of diplomacy.

Probably the greatest compliment to his ability and soundness of reasoning is the fact that other industrialists seek his advice. He is a past president of the New England Council, did much to build that organization to its present position of eminence. Besides being president and treasurer of Taft-Peirce Mfg. Co., he holds several corporation directorships.

Recently, he was elected president of the National Machine Tool Builders Assn., a post of vital importance to the defense effort because of the critical need for tools. With customary thoroughness, he has joined the efforts to give industry the tools it needs.

Among his proudest possessions is a 200-acre apple farm in Cumberland Hill, R. I. Other favorite hobbies are sailing and fishing, which occupy weekends whenever he can get away to his summer home in Harwichport, Mass. He's always been active in local affairs; for the past several years he's been president of the Woonsocket Hospital.

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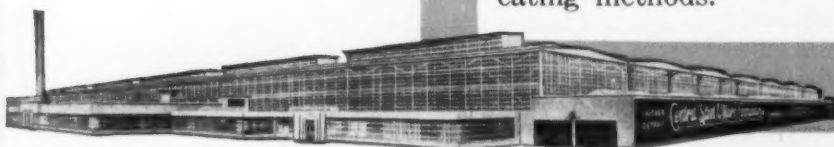
Many end use restrictions are in effect limiting the use of Chromium-Nickel Grades of Stainless.

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The Iron Age

INTRODUCES

Fred T. Wiggins, advanced to vice-president and sales manager of ATLAS PORTLAND CEMENT CO. George H. Reuter becomes executive vice-president, Charles R. Baker, vice-president and general attorney and Donald C. Leo, secretary.

William G. Whyte, appointed as assistant director of public relations, Chicago district, for U. S. STEEL, succeeding Paul Thixtun, who was promoted to the position of director of public relations at Louisville.

Charles William Gilmore, appointed direct factory representative, Philadelphia, covering Eastern Pennsylvania, for MALSARY MFG. CO. Others appointed: James M. Williams in Nashville, to cover Tennessee, Mississippi, Kentucky and Alabama; George Karikas, Cleveland, to cover Michigan, Ohio and Western Pennsylvania; Robert L. Garrison, Chicago, to cover Iowa, Illinois and Indiana.

P. D. Doran, promoted to chief, commercial sales, at PRATT & WHITNEY AIRCRAFT, East Hartford, Conn. Mr. Doran is succeeded as head of the airlines engineering department by Frank W. DuLyn.

Roy J. Heinz elected vice-president of the PITTSBURGH STEEL FOUNDRY CORP. and is in charge of operations at its Glassport, Pa., foundry.

Russell H. Coe, appointed to represent the TAPECOAT CO. in Ohio, West Virginia and Western Pennsylvania.

Godfrey Strelinger, elected secretary to succeed Horace J. Mellum who is retiring from the NASH-KELVINATOR CORP., Detroit.

J. B. Ford, Jr., elected to the board of directors of DETROIT STEEL PRODUCTS CO.

Herbert A. Stanton, named president of the new sales-distributing company—NORTON BEHR-MANNING OVERSEAS INC., Mexico City. Edgar A. Maschal is vice-president and general manager. Directors include: A. Donald Kelso, executive vice-president of the company; Jess N. Dalton and Julio Riquelme, Edgar A. Maschal and Herbert A. Stanton.

Melvin J. Henry, appointed general sales manager of the UNITED LACQUER MFG. CORP., Linden, N. J.

R. B. McLaughlin, elected chairman of the board of TEXAS-EMPIRE PIPE LINE CO. Others elected: J. W. Emison, president; J. T. Rynd, vice-president and general manager; O. A. Newport, a vice-president and C. H. Albitz, assistant general manager, operations.

Stephen J. DeVoe, Jr., elected president of DeVOE IRON WORKS, INC.

Ralph E. Petering, elected vice-president and treasurer of the EMERSON ELECTRIC MFG. CO., St. Louis, succeeding William S. Snead who is retiring.

William M. Lana, heads the new office of SPRAGUE ELECTRIC CO. in Dayton.

Robert J. Loskill, named manager of the sales training division, CATERPILLAR TRACTOR CO., Peoria, Ill. Thomas A. Glass succeeds Mr. Loskill as assistant manager of the governmental division.

Turn Page



RALPH J. PRICE, recently appointed chief metallurgist for the Los Angeles plant of Bethlehem Pacific Coast Steel Corp.



LYMAN D. WARNER, appointed vice-president market & product development and promotion, American District Steam Co., Inc., North Tonawanda, N. Y.



E. R. ORDWAY, appointed as general manager of Kaiser-Frazer Corp. aircraft production on the West Coast.



Constantly Checking

rechecking and checking again and again is the reason why you can put your confidence in Universal Precision Balls.

The Superficial Rockwell Testing Machine illustrated above checks steel balls for hardness. It is particularly well adapted for making accurate readings on small metal masses as encountered in balls of diameters $\frac{1}{32}$ " to $\frac{1}{8}$ ".

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PRECISION BALLS OF CHROME
AND STAINLESS STEEL, BRONZE
AND SPECIAL METALS.

WILLOW GROVE, Montgomery County, Pa.
Telephone, Willow Grove 1200

Personnel

Continued

M. J. Harper, named Eastern Regional manager, with headquarters in New York City, by ROCKWELL MFG. CO. The Central Region will be supervised by P. C. Kreuch with headquarters in Pittsburgh. The Southern Region will be headed by J. W. Northcutt with offices in Atlanta. C. K. Madison heads the Mid-Western Region, with offices in Houston, and H. Boezinger will manage the Los Angeles office—Western Region.

N. T. Joyner, appointed to the technical staff of the Votator Division of the GIRDLER CORP., Louisville, Ky.

Walter G. Engler, appointed general sales manager of the GIFFORD-WOOD CO., Hudson, N. Y.

Lon E. Russell, named as sales engineer for the Machinery Division in the Metropolitan New York territory for DRAVO CORP.

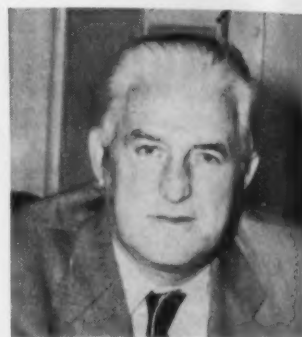
Paul A. Rothschild, joined the firm OREN H. SMITH CO., Chicago, as director of sales engineering.

Richard P. Molt, named a research engineer in the structural research department at ARMOUR RESEARCH FOUNDATION of Illinois Institute of Technology.

H. G. Hart, transferred to the new Specialties and Retail Department, Pittsburgh, of HARBISON-WALKER REFRACTORIES CO. Floyd A. Pearce replaces Mr. Hart in Portsmouth and E. A. Olson has been appointed to the Pittsburgh sales district as a replacement for Mr. Pearce.

George C. Houston appointed manager of manufacturing training in GENERAL ELECTRIC CO.'s manufacturing personnel development services department. Edward A. Green has been named manager of product planning, small and medium motor department.

Frank Mussell, Eastern territory manager for ALLIS-CHALMERS Tractor Division, has been appointed director of Agricultural Machine and Implement Division of Industrial and Agricultural Equipment Bureau of National Production Authority, with headquarters in Washington. Charles R. Martin, named in charge of manufacturing, production planning and production control at Hawley Works. Henry F. Banzhaf, appointed assistant to the manager, Hawley Works.



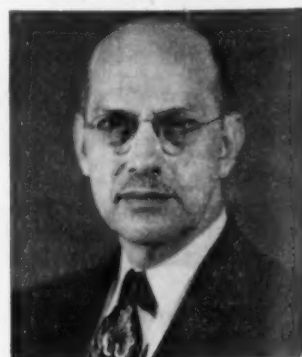
J. HENRY ANTHONY, appointed plant superintendent of Whitney Chain Co., Hartford, Conn.



JAMES P. BACON, appointed manager of sales, tubing specialties division for National Tube Co., Chicago.



ARTHUR W. HASENPFLUG, appointed a vice-president of Artisan Metal Works Co., Cleveland.



FRED A. MONTGOMERY, recently appointed chief engineer of Artisan Metal Works Co., Cleveland.

Personnel

Continued

E. Kirk Hamilton, appointed works engineer of the AC Spark Plug Div. of GENERAL MOTORS CORP., at Flint, succeeding Ernest J. Kelly, retired.

John M. Dumser, named assistant general sales manager, Wolverine Tube Div. of CALUMET & HECLA CONSOLIDATED COPPER CO., Detroit.

J. T. Bell, promoted to Detroit district manager for the MID-WEST ABRASIVE CO. of Owosso, Mich. James J. Corcoran is now responsible for the customer service division and G. Reagh Atkinson and D. F. McDonald have been added to the company's staff of service engineers.

C. W. Streit, Jr., elected president of SOUTHERN CEMENT CO., Birmingham. C. H. Ellison, Jr., becomes general sales manager, and Dave H. Shearer sales manager of the company's lime division.

Edward A. Murray, elected vice-president in charge of sales of APPLETON ELECTRIC CO. Mr. Murray was formerly manager of the Chicago sales district for American Steel & Wire Co.

OBITUARIES

Herbert Benjamin Spigel, 38, an executive of Luria Bros. & Co., Inc., Philadelphia, Mr. Spigel was general manager of Luria's foreign import division and head of the advertising department.

James M. Brown, manager of the Cleveland district Industrial Sales office of Surface Combustion Corp. Mr. Brown had been associated with the company since 1927.

Lansing W. Althof, 65, district engineer for the Union Pacific Railroad, Northwestern district, at his home in Portland, Ore.

Earl L. Brokenshire, ore sales manager of Oglebay, Norton & Co., and associated with the company since 1909, died at the age of 59.

Darwin Luntz, Luntz Iron & Steel Co. died recently. Former president of the Scrap Dealers Association and ex-officio member.



UNIFORM . . .
by every measurement
for quality wire!

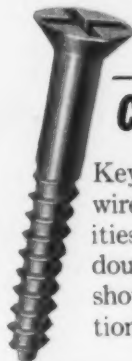
To make certain Keystone Wire measures up to your specifications, rigid quality controls are maintained throughout its manufacture.

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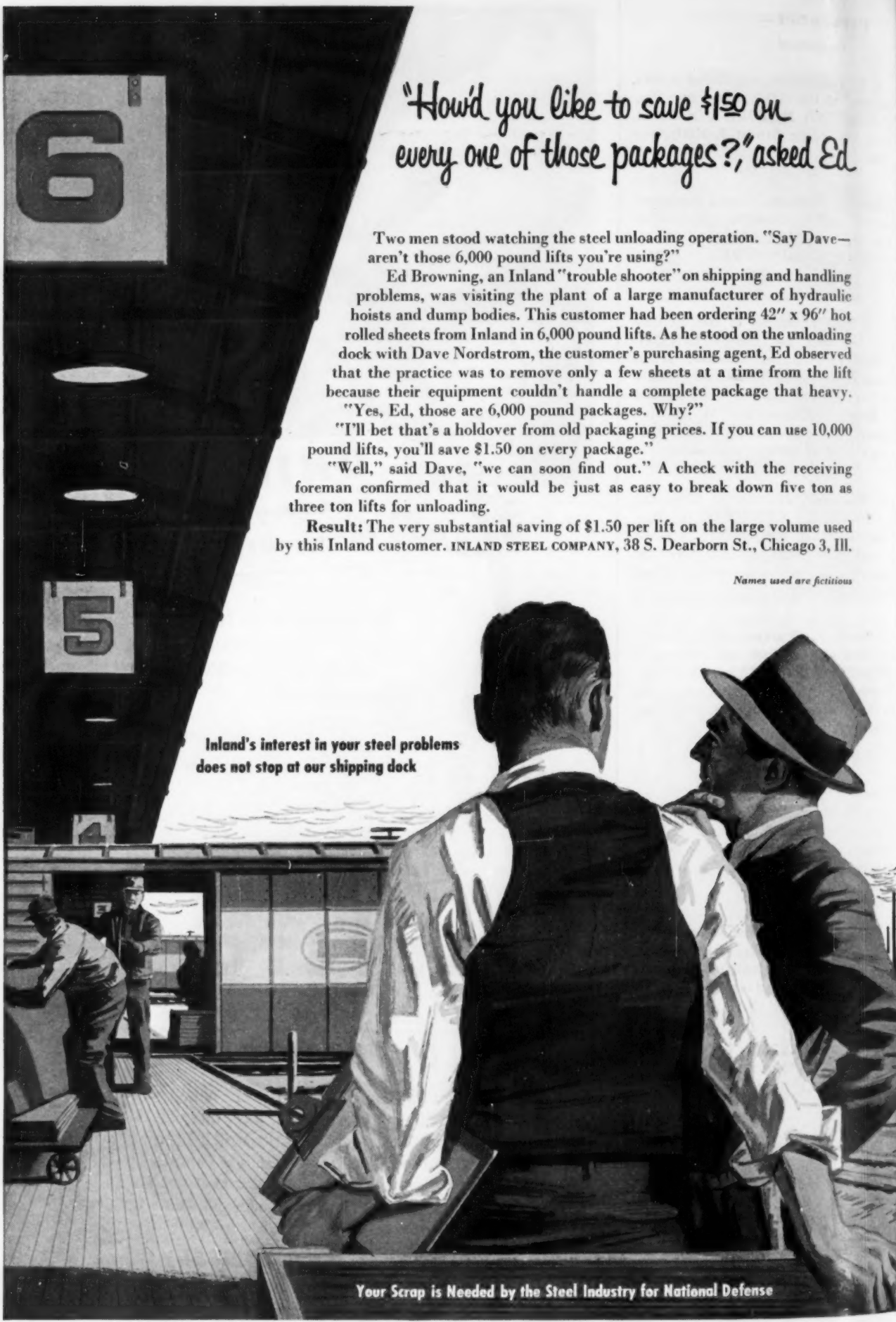
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More
SCRAP
today...
More
STEEL
tomorrow!

A black and white illustration of a steel unloading dock. In the foreground, two men are seen from behind, looking out over the dock. One man is wearing a suit and a fedora, while the other is in a light-colored shirt and a dark vest. In the background, two workers are handling a large sheet of steel on a cart. The dock has large numbers '4', '5', and '6' on its side, and a large Inland Steel logo is visible. The scene is lit by overhead lights.

"How'd you like to save \$1.50 on every one of those packages?," asked Ed

Two men stood watching the steel unloading operation. "Say Dave—aren't those 6,000 pound lifts you're using?"

Ed Browning, an Inland "trouble shooter" on shipping and handling problems, was visiting the plant of a large manufacturer of hydraulic hoists and dump bodies. This customer had been ordering 42" x 96" hot rolled sheets from Inland in 6,000 pound lifts. As he stood on the unloading dock with Dave Nordstrom, the customer's purchasing agent, Ed observed that the practice was to remove only a few sheets at a time from the lift because their equipment couldn't handle a complete package that heavy.

"Yes, Ed, those are 6,000 pound packages. Why?"

"I'll bet that's a holdover from old packaging prices. If you can use 10,000 pound lifts, you'll save \$1.50 on every package."

"Well," said Dave, "we can soon find out." A check with the receiving foreman confirmed that it would be just as easy to break down five ton as three ton lifts for unloading.

Result: The very substantial saving of \$1.50 per lift on the large volume used by this Inland customer. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago 3, Ill.

Names used are fictitious

Inland's interest in your steel problems
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Your Scrap is Needed by the Steel Industry for National Defense

UNUSUAL MACHINE APPLICATIONS

The Iron Age
FOUNDED 1833
Technical Articles

speed defense tooling



by W. G. Patton
Detroit Editor

Some 70 pct of the machine tools in Chevrolet-Cleveland's tank drive production are used tools. This plant avoided hard-to-get standard tools as much as possible. Some applications of machines which were available are unusual, but they do the job well. Less-skilled labor is needed than conventional tooling would require. And tooling-up was completed months earlier than if all tools had been bought new.

Ingenious adaptation of high production specialized automatic equipment to the production of medium tank parts marks Chevrolet's Cleveland plant. The policy has enabled it to reach production months ahead of any schedule possible if standard machine tool applications had been made.

The Chevrolet-Cleveland tooling policy has avoided orders of machine tools that are already in great demand. It has also reduced the cost of tooling substantially and made it possible for relatively unskilled workers to use equipment with which they are already familiar.

Some of the machine tools now in use at Cleveland will be changed later as the company gains production experience. In the meantime, a limited volume of tank parts has already started flowing from the Chevrolet-Cleveland plant.

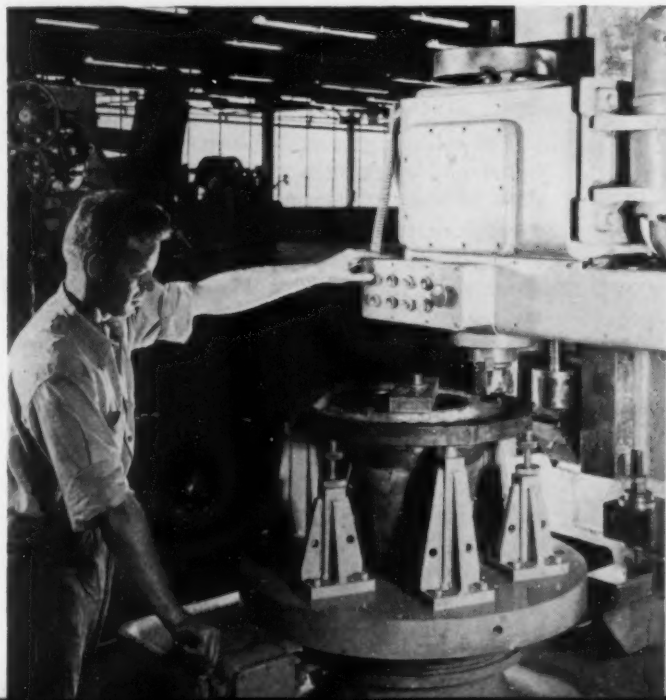
While this comparatively low production job by automotive standards, the size of the job requires a comparatively long machining and fabrication cycle. This has made it practical to adapt high production, automatic equipment to the parts involved.

Approximately 70 pct of the machines being used were purchased from established used machinery dealers. About 20 pct of the equipment is new. Army Ordnance has furnished less than

10 pct of the equipment being used on the job.

Specifically, the Chevrolet-Cleveland plant has been able to avoid the purchase of equipment like vertical turret lathes, standard vertical mills and standard turret and engine lathes. This is

MILLING final tank drive carrier on a rebuilt Sundstrand machine at Chevrolet-Cleveland plants.





BORING MILL, a 42-in. King, fitted with an improvised grinder attachment, surfacing tank drive carrier flange.

Unusual applications (continued)

the kind of equipment that is in top demand today for defense programs.

Chevrolet will furnish the final drive gear assemblies for the Fisher tank program. Specific parts being produced and assembled at Cleveland include the final drive case, carrier, gears, pinion, shaft, hub, cap, and miscellaneous parts.

Of many examples of ingenious adaptation of machine tools at the Cleveland plant, three are typical. A good example is the use of a Sunstrand No. 3 profile mill to machine the final drive gear case. Another is the adaptation of a Potter and Johnson machine for boring, facing and counterboring the carrier final drive. A third is the utilization of a comparatively slow radial drill for precision drilling, spot facing, and reaming, while utilizing comparatively unskilled operators.

The milling operation being performed on the Sunstrand machine would probably normally be done on a standard vertical mill, which is today a very critical type of machine tool. Special Sunstrand machines from World War II surplus, it developed, were readily adapted to the job of milling the face of the carrier and case.

The machine is basically a rotary table mill. The part rotates while in contact with the milling cutter. The milling cutter itself is suspended on the part of the machine which travels horizontally. By combining the rotary action of the table with the horizontal travel of the milling head, it is possible to mill the same profile that would normally be performed by a Cincinnati Hydro-

Tel or a similar profile machine. Four of these Sunstrand machines will be used.

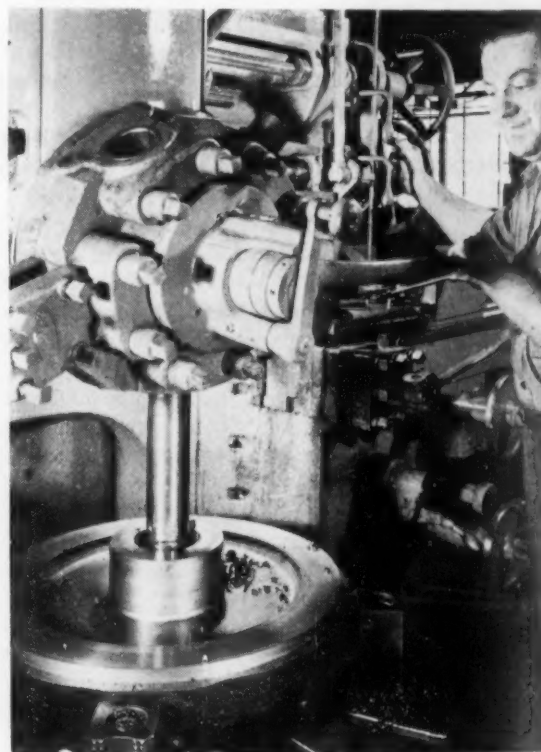
The material is cast chromium-nickel-molybdenum armor plate. The cutter is standard carbide-tipped, having a negative rake. The rotating work table is driven by a Sunstrand fluid motor. This gives variable speeds of rotation to meet variations in cutting.

Approximately $\frac{1}{2}$ in. of metal is presently being removed from the casting, but this operation is expected to be reduced somewhat as the tank program progresses and additional sources of castings become available. The rotary feed rate is 3 ipm. However, this is expected to be increased to a point where a 10-min machining cycle is possible.

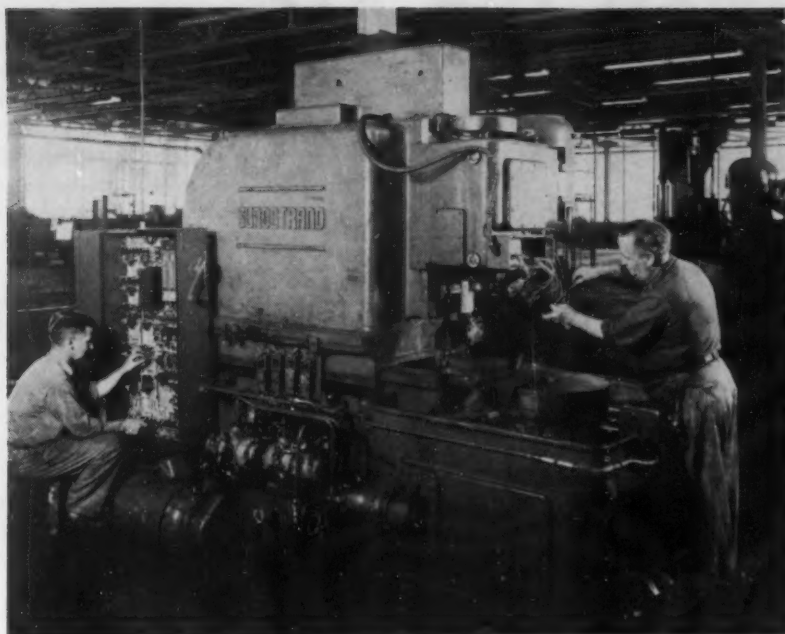
Temporarily, supplementary grinding is being used to produce parts that are necessary to meet early delivery schedules. Eventually, it is believed, the grinding operation will be eliminated.

Vertical boring and turning machines are critical items on the list of available machine tools for defense. With this condition in mind, a Potter and Johnson 9DT machine was selected for boring, facing and counterboring the final drive carrier. Specific operations performed on this machine include bore and chamber two bearing diameters, bore clearance diameter, face end to length, back face opposite end, and turn seal ring diameter.

This machine gives a full, automatic cycle operation that is well suited to unskilled operators. The part is held against the face plate by a series of clamps. Tolerance for this semi-finish



MACHINING final tank drive gear blank on Bullard vertical turret lathe at Chevrolet-Cleveland.



WAR SURPLUS Sundstrand machines being rebuilt for use on tank drive parts. Chevrolet-Cleveland will use the machines in place of scarce profile millers.

operation is ± 0.005 in. This operation is followed by a precision boring operation on a standard Heald precision-type machine.

Use of a Bullard spacer in conjunction with an old model radial drill is a method of getting higher production out of comparatively slow equipment. In a normal radial type drill it is necessary to move the arm and the drill spindle in and out on the rail. The machine has to be positioned accurately over each hole to be drilled. This requires trained operators. It also requires complicated bushing plates, and a high grade machine.

Use of the Bullard spacer removes much of the need for operator skill from the job. The drill overarm and head are locked in one permanent position. This minimizes the wear factor on the old equipment. The part itself is moved under the spindle of the machine to present

locations. These locations are permanently set up by trained operators. A comparatively unskilled operator can move the necessary controls that cycle the machine.

Late model radial drills are scarce. The price of good used equipment is very high. By buying Bullard spacers which have the necessary accuracy built into them, older types of drilling equipment can be used successfully. Approximately 20 holes are drilled and counterbored in this operation. The position of the holes is held within ± 0.005 in.

Chevrolet-Cleveland also plans to use Fay and other types of automatic lathes for turning tank parts. The automatic machines are more readily available at present than standard engine lathes and the production rate is expected to be somewhat greater. In addition, less operating skill is required from the employee.

Suds supply solution for the navy

The same powered shaving lather dispenser the barber uses is now lathering lenses, preparatory to polishing them. It seems to be the only way to polish the soft crystals used to transmit invisible light and heat rays.

Soap suds were applied to the job by S. I. Slawson, scientist at the Naval Research Laboratory, Office of Naval Research, Washington. He made the discovery only after numerous failures with conventional materials.

The lather not only floats away the metal powders used in grinding and polishing crystals, but also has a polishing effect of its own. Ex-

periments showed that liquid soap or soap suds whipped up in a shaving mug will do the job.

Normally, in a lens polishing job, successively finer abrasive powders are used. The particular lenses the Naval Laboratory was working on, however, are made up of heavy-metal halides so soft that they can scratch themselves. That is why the special characteristics of the lather proved so useful.

As the polishing process has been developed by the Navy, the lather contains a garnet powder for initial grinding and an aluminum oxide for the final polishing.

INDUCTION AND GAS FURNACE MELTING COSTS COMPARED



By Stewart C. Parker
Industrial Engineer
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The use of low-frequency induction furnaces and gas furnaces in the diecasting industry is evaluated. Induction furnaces offer close temperature control, cooler working conditions. Gas furnaces are more adaptable though in some cases burner input has been geared to foundry rather than diecasting practice. New type gas furnace offers automatic operation.

Introduction of modern low frequency electric induction furnaces for diecasting, as a competitor to gas, has created controversy as to the most economical fuel for melting purposes. Melting aluminum for diecasting is a temperature control and holding job. Gas had been the preferred fuel.

A good gas-fired pot-type furnace can melt aluminum on the basis of 2400 btu input per lb of metal melted on a 20-hr daily production schedule. An induction furnace will require about 0.28 kw to do the same job.

If gas cost is 7¢ per therm and electricity 1.47¢ per kw, including demand charge, we arrive at the following cost:

Gas

$$\frac{100 \text{ lb Al} \times 2400 \text{ btu}}{100,000 \text{ btu/therm}} \times \$0.07 = \$0.168$$

Electricity

$$100 \text{ lb Al} \times .28 \text{ kw/lb} \times \$0.0147 = \$0.41$$

Except where electric energy may be purchased at very low cost, or where manufactured gas cost may be high, the answer invariably favors gas.

Considering the relatively large differential between the cost of gas and electricity, it seems practical to ask, "Where does induction melting fit in the nonferrous field?"

The lf induction melting furnace operates on

the principle of a short-circuited transformer. A secondary ring of molten metal contained within nonconductive refractory channels passes around the primary coil.

Alternating current applied to the primary induces a low voltage and high amperage in the molten metal within the channels. Heat generated in the secondary causes the molten metal to flow and mix with metal in the main furnace receptacle where the temperature continues to rise until an equilibrium is reached. Equilibrium is incorporated in the design of an induction melting furnace so that temperature will continue to rise, even after top and side losses are accounted for, until the maximum hourly hot metal delivery capacity is attained.

The user pays only for the btu requirements to heat the metal. Expensive furnaces may be

TABLE I
INDUCTION ALUMINUM MELTING FURNACES

Model	A	B	C	D	E
Power rating, kw....	20	20	25	25	35
Use	Holding	Holding	Melting	Melting	Melting
Melting rate, lb/hr...	.....	.....	75	75	150
Holding capacity, lb.	700	450	700	450	650

Courtesy Ajax Engineering Corp.

eliminated and large labor savings effected. Skin heating effects can be obtained, scaling is reduced through fast heating, and subsequent heat processing is eliminated.

Induction melting is mass heating. A mass of metal must be heated through a predetermined temperature rise as with other fuels. No furnaces are eliminated; induction melting furnace equipment costs 3 to 4 times that of gas furnaces.

There is no labor saving in the melting and handling operations. The induction furnace requires more operator hours because channel cleaning should be performed every 4 to 8 hr. Extra labor and gas fuel are required to preheat an induction furnace for 4 to 24 hr before metal can be charged. Chief claims of induction melting furnace manufacturers are in improving the quality of the melt and comfort of operating personnel. The latter is accomplished, but the former claim is controversial.

Diecasting furnaces are generally classified as "melting" or "holding." A melting furnace is charged with cold metal. A holding furnace is charged with hot metal.

Fan failure may cause damage

On Ajax Engineering Corp. furnaces the horizontal transformer core around which the primary winding is wrapped passes through the secondary molten metal loop. A blower cools the primary coil. Fan failure may cause serious damage. The hot metal reservoir has a hinged insulated cover which reduces top radiation losses.

The ratio of holding capacity to melting rate (Table I) ranges from about 5.5 to 1 to 9.5 to 1. This wide ratio is probably used to keep down demand charges and is the chief reason for the ability to maintain close temperature control of molten metal while in production.

In the Lindberg-Fisher two-chamber induction furnace a chamber for ingots or molten metal is connected to the pouring chamber by two melting channels. This design is said to produce cleaner metal with oxides, slags and dross floating or sinking to the bottom of the charging chamber. Only clean metal passes to the second chamber for pouring and ladling, according to the manufacturer's claim. Each chamber has an insulated lid to reduce top heat losses. Controls hold temperatures within a $\pm 5^\circ\text{F}$ range. The ratio of furnace holding capacity to melting rate is approximately 4.2 to 1.

Most operators agree that if the molten metal can be held within $\pm 10^\circ\text{F}$ of supplier's specifications, rejects need not be charged to the fuel or melting practice.

Induction furnaces operate inside this temperature range, while most gas-fired crucible melting furnaces do not. Gas-fired holding furnaces having low burner input and with modulating type temperature control, can maintain a very close degree of accuracy.



DIECASTING MACHINE operators often prefer induction furnaces because their greater insulation improves working conditions. Above is Lindberg Engineering Co.'s 40 kw unit.

Usually, rejects can be traced to die design, casting practice, air pressure and delays in machine operation which affect die temperature. Oxide formations on top of the metal may be ladled into the machine chamber. Such formations are less on the average gas furnace, due to some surface protection from the products of combustion.

The induction furnace is cool compared to the average gas furnace, even though wall thickness and insulation are no greater. "Thru wall" losses are from metal temperature. Such losses on gas furnaces are from combustion chamber temperature. These range from 400° to 800°F over metal temperature on aluminum melting furnaces. Gas-fired holding furnaces generally operate with a low thermal head.

The insulated covers of the induction furnace protect the operator from some top radiation. Diecasting machine operators have indicated a preference for induction furnaces from a personal comfort standpoint.

Metal surges with current change

Induction melting eliminates crucible cost. But induction furnaces do burn out channels (indicating some localized overheating), due to accumulation of oxides and drosses. Lining and rebricking are more complicated and costly because of channel construction. It is not uncommon for users of induction furnaces to bring in labor to clean the channels during weekend periods.

The surge of molten aluminum in an induction furnace, as current is applied and interrupted, is credited with reducing alloy segregation. During agitation on the two-chamber induction furnace, about twice a minute, the molten contents of the melting and pouring chambers are "swished" from pot to pot through the secondary channels. The direction of flow is uncontrollable.

The surging can and probably does prevent or reduce segregation of harmful foreign matter. It cannot minimize oxidation. As current is applied and released, most foreign matter, including nonmetallic particles cast off from the

TABLE II

INDUCTION FURNACE MELTING COST FOR DIE CAST ALUMINUM

Operated hr per Day	Production hrs per Month	Holding hrs per Month	Metal Melted per Month at 132 lb per Production hr	Kwh's Used in Production at .24 Kw lb Melted Incl. Radiation Loss	Kwh's Used for Holding at 8 Kw per hr	Total Kwh's Used
8	192	528	25,344	6,083	4,224	10,307
16	384	336	50,688	12,165	2,688	14,853
24	576	144	76,032	18,248	1,152	19,400

MONTHLY POWER COST					
Energy Charge 1.06¢/Kwh	Demand Charge \$1.90/Kwh*	Total Charge	Average Cost per Kwh	Total Power Used per lb of Metal Cast	Melting Cost per lb
\$111.32	\$66.50	\$117.82	\$.0172	.407 kw	\$.0070
\$160.42	\$66.50	\$226.92	\$.0183	.293 kw	\$.0045
\$209.52	\$66.50	\$276.02	\$.0142	.255 kw	\$.0036

* Based on 35 kw the manufacturer's rating for the furnace. A check taken on a 40-kw rated two-chamber induction furnace indicated a maximum demand of 48 kw.

Die casting furnace (continued)

furnace refractory, is attracted to the secondary channels where it adheres or is released.

There is reason to believe the continual turbulence of molten metal will not permit separation of foreign, injurious matter. Dross, slag and nonmetallic particles may be held in suspension and poured into the castings unnoticed. Alloy segregation is generally the result of underheating. The tendency of gas furnaces is to overshoot, rather than underheat.

Many authorities prefer a still metal bath because drosses, slags, oxides and nonmetallic particles sink or float depending on their specific gravity. The operator usually manipulates the pouring ladle to exclude oxide that forms at the surface.

Aluminum at high temperature readily combines with oxygen in the air. Agitation tends to accelerate the reaction. The molten metal in an electric furnace is in direct contact with the atmosphere. A conventional gas furnace has a thin protective layer of combustion products above the pot which tend to retard oxidation.

May pick up hydrogen

The possibility of gas pickup by aluminum alloys increases as temperature rises. Hydrogen and hydrogen dissociated from moisture in the atmosphere surrounding the metal bath are most harmful. Even though combustion products are not present in an induction furnace, moisture may be contained in the air above the bath or carried into the furnaces with cold charges.

Advantages of induction melting can be summarized in cooler working conditions and close temperature control. Reduced alloy segregation is possible in some instances. Induction furnaces do not lend themselves to changes in alloy or production schedule as readily as crucible furnaces.

An induction furnace, at temperature and in

production, will use from 0.20 to 0.30 kw per lb of metal melted. In addition, electric energy is required to hold the furnace at or above alloy melting temperature, production or no production. Power requirements, per unit of metal, depend on demand charges, and hours of actual production in relation to holding hours.

When induction melting furnaces are used estimates of diecasting costs should be correlated with daily production schedules, or energy may cost approximately twice as much on an 8 hr per day run as on 24 hr per day production.

Industrial electricity is generally purchased on a demand and energy basis. Where induction melting is concerned, demand will normally be the maximum kw rating of the furnace. The energy charge is computed from the total kw-hr used or recorded in the month. The number of hours an induction melting furnace operates per day, week or month, is an important factor in determining metal melting cost.

The impact of demand charge and operating hours on induction melting costs is shown in Table II. Data are based on a single induction melting furnace having an input of 35 kw (max demand) producing an average of 132 lb of aluminum alloy castings per hr, while in production, on a 24 days per month schedule.

Gas is usually purchased on the equivalent of an energy charge only. The customer pays only for fuel used without regard to the time of day or the number of hours his plant operates.

In the event of power failure, molten metal in the induction furnace must be removed. If permitted to freeze, the solidified metal must be melted out with torches before the furnace can be returned to service.

Nonferrous metals used in sand foundry practice require temperatures 200° to 300°F above melting point to offset heat loss in transferring hot metal. Also, the entire furnace capacity is cast off soon after metal has been brought to temperature.



FURNACE MAKERS are designing equipment such as this Stroman open flame melting and holding furnace to meet the needs of modern diecasting plants.

In diecasting, metal is held just above the melting point and ladled or pumped off in small amounts. Close temperature control is required. A ratio of about 4 to 1 between pot capacity and melting rate should maintain a temperature control range comparable to the If induction melting furnace $\pm 5^{\circ}\text{F}$. This ratio should be capable of absorbing the shock of a full-sized cold ingot addition and have sufficient turn-down to "hold" temperature only without overshooting.

Not infrequently, crucible type furnaces, designed for sand foundry practice are selected for cold chamber diecasting. These furnaces, built for fast heating, have a low ratio between melting rate and holding capacity. When used for diecasting they are often undersized and must be forced, resulting in high combustion chamber temperatures, overshooting and excessive refractory maintenance.

The btu input specifications on some popular induction and gas furnaces, as shown in Table III indicate why close temperature control for the gas type pot furnace is difficult and why maintenance is high. It appears gas appliance manufacturers have geared burner input to foundry practice.

With this in mind, the gas furnace manufac-

TABLE III
POT CAPACITY AND BTU INPUT OF INDUCTION
AND GAS FURNACES

Make	Pot Capacity in lb	Max. hr btu Input	Approx. Max. hr Melting Capacity (lb of AL.)
Induction A.....	450	88,325	75
Induction B.....	700	120,000	165
Gas A.....	400	800,000	330
Gas B.....	400	750,000	310
Gas C.....	300	780,000	320

turer should differentiate between foundry and diecasting practice in the design of furnaces, burners, and temperature controls.

Nonferrous metals can be melted more efficiently in large quantities. Large meltdown furnaces of the reverberatory type are popular. To insure quality melting, however, frequent drossing or cleaning of the bath, proper use of fluxes, and control of furnace atmosphere and temperature are necessary.

Holding furnaces may be either crucible or reverberatory type, with relatively small burner capacity. Small reverbs are also used as combination melting and holding units to supply diecasting machines directly. Reverberatory furnaces lack the flexibility of crucible furnaces regarding frequent alloy changes.

Several types of aluminum melting furnaces are being manufactured as standard gas equipment. A two-chamber gas-fired aluminum melting furnace features a rectangular iron melting pot coated with a special fired ceramic. The pot is divided by a ceramic coated baffle. This extends to within 1 in. of the bottom of the pot to permit molten metal to pass from the charging to the pouring chamber. The furnace provides advantages of the two-chamber induction furnace without hot metal agitation.

Some of the newer reverb furnaces feature low fuel requirements and multiple dip-out wells. Burners fire downward at an angle across the metal bath. Cold metal is charged into the stack, recovering much heat normally lost in crucible type furnaces. Where thin section scrap is stack charged, however, metal losses may be high.

New models developed

Stroman's DC reverb is a single-well unit for holding or melting metal to supply the diecast machine direct. These can be stack or well charged. Outer shells protect the operator.

About a year ago Federal Die Casting Co. of Chicago developed a 750 lb-capacity aluminum melting furnace. Its low, rectangular pot can be coated on the inside with ceramic material to eliminate iron pick-up. The products of combustion do not contact the molten aluminum and are vented through the flue. Federal claims as close, if not closer, temperature control than with an induction furnace.

Seven semiradiant type burners are located in each side of the furnace wall. There is no flame impingement on the pot since the multiple burner port openings fire parallel to the furnace wall. Low turn-down for holding is possible.

Eclipse Fuel Engineering has installed 20 special tilt-type crucible holding furnaces for attached permanent mold casting of aluminum alloys at Ebaloy, Inc., Rockford, Ill.

The mold and its mechanism are fastened to the top or lid of the furnace. When the furnace is tilted, metal pours into the mold at a controlled rate. Operation is completely automatic.

How to USE COPPER ALLOYS in *FORGINGS AND* *EXTRUSIONS*

Part I



By L. F. Spencer
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Copper extrusions and forgings are gaining ever wider use. Extrusions often replace machined parts or simple forgings, and forgings often replace machined parts or sand or die-castings. Certain variations from standard extrusion and forgings practice and design enable most effective use of copper alloys.

Extrusions have long been produced within the copper industry in the form of bar, wire and rod. More recently has this product been used as structural shapes as well as a substitute for simple forgings and sand or diecastings. Extrusions are also used as a pre-form for complex forgings, where the extruded shape conforms somewhat to the shape of the final forging. Thus the forging may often be completed in one blow with a minimum of flash.

All of the copper alloys are extrudable; however, not all of them can be produced economically. Those alloys which are more commonly used as listed in Table I.

Due to their high electrical conductivity, the high copper alloys are used quite extensively in the electrical industries. Muntz metal, an alloy containing 60 pct copper and 40 pct zinc, is considered to be an ideal alloy for extrusion. However, its machining characteristics are not too favorable. In many instances, it is necessary to modify this alloy in order to improve either machinability, strength or corrosion resistance.

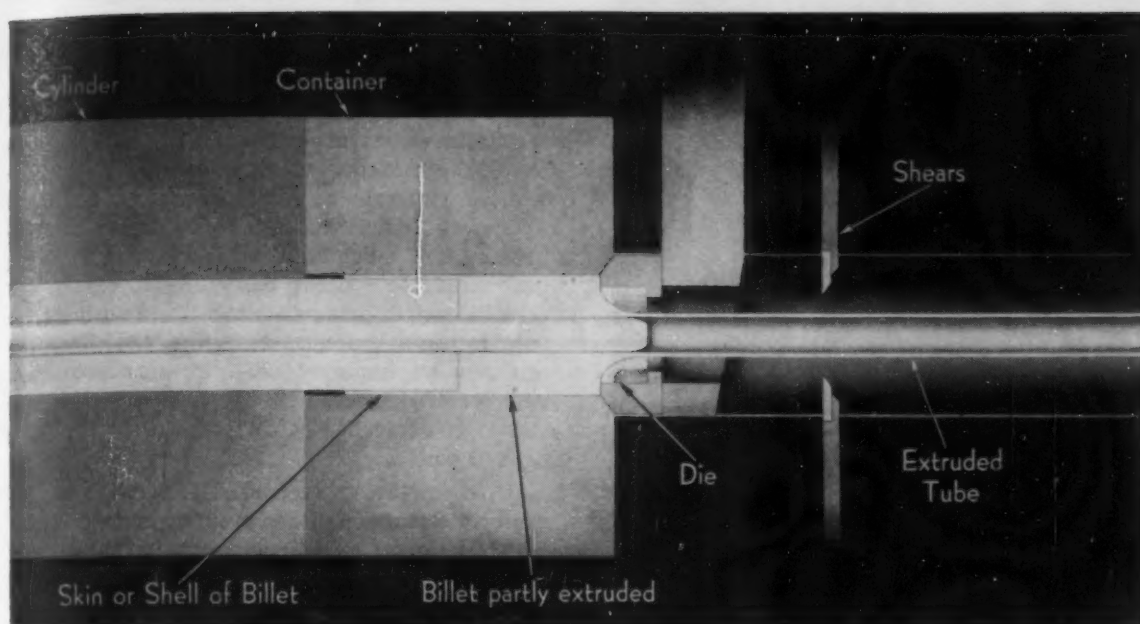
Both architectural bronze and forging brass are widely used in the extruded form, their

machinability being satisfactory. Where considerable machining is to be done on the extruded section, it is more common to employ free-cutting yellow brass. Manganese bronze and naval brass are also used in extruded sections where machinability is not too important.

The high copper alloys and compositions containing refractory alloys such as the silicon bronzes require high pressure for extrusion. Thus, for free-cutting yellow brass and naval brass, extrusion pressures of approximately 35,000 psi are required, while some of the silicon bronzes and leaded phosphor bronzes need pressures as high as 140,000 psi.

Size limitations of extruded shapes depend on the specific alloy and the cross-section desired. Usually, the effective size is 6 to 7 in. The length of the extruded section is governed entirely by weight, the maximum weight for a single extrusion being approximately 180 lb.

Extruded shapes can be made to greater thicknesses than drawn shapes, and can be designed with sharper corners. Radii and fillets on copper-base alloy extrusions can be as low as 1/64 to 1/32 in. Dimensional tolerances vary from 0.005



EXTRUSION of copper-base alloy tubing. Essentially the same method is used for other shapes. Ram advances and forces metal in billet to flow between metal and die. Rough surface skin of billet remains behind as shell.

TABLE I

COPPER ALLOYS FOR EXTRUSION

Metal	Extrusion Temperature, °F	Average Mechanical Properties as Extruded			
		Rod and Bar		Tube	
		Tensile Strength, psi	Elongation in 2 in., pct	Tensile Strength, psi	Elongation in 2 in., pct
Electrolytic copper.....	1500-1650	32,000	40		
Deoxidized copper.....	1500-1650	32,000	40		
Leaded copper.....	1500-1650	32,000	40		
Red brass, 85 pct.....	1450-1600			38,000	50
Muntz metal.....	1250-1350	52,000	45		
Free-cutting brass.....	1300-1400	48,000	45		
Forging brass.....	1250-1350	50,000	45		
Architectural bronze.....	1200-1300	54,000	45		
Admiralty metal.....	1400-1500			46,000	65
Naval brass.....	1200-1350	55,000	45		
Leaded naval brass.....	1200-1350	55,000	45		
Aluminum brass.....	1450-1550			48,000	65
Aluminum bronze:					
5 pct.....	1500-1600	50,000	60	50,000	55
8 pct.....	1350-1450	60,000	60		
Cupro-nickel:					
30 pct.....	1900-2000			54,000	35
20 pct.....	1800-1900			48,000	40
High-silicon bronze (A).....	1400-1500	53,000	70	53,000	65

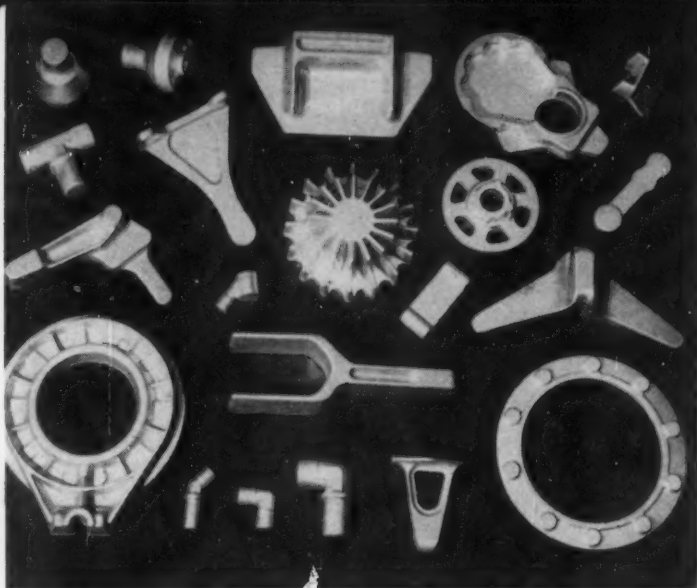
in. on dimensions up to 0.125 in., to 0.035 in. on dimensions over 5 in.

The control of lead is highly important with alloys that require a high extrusion temperature. The alpha brasses and commercial coppers of high lead content are not commonly extruded. Large, simple sections have been made under controlled conditions with lead content as high as 5 pct. Those alloys that have a combined sum of nickel and copper in the range of 60 to 63 pct or higher, such as the nickel silvers and cupro-nickels, are extremely difficult to extrude. They

are usually confined to simple and relatively large sections.

In the extrusion of copper-base alloys, the pressure depends on such factors as the extrusion temperature, the reduction in area from billet to extruded product, and the speed of extrusion. The influence of these factors diminishes in the order given.

A skin or shell remains after extrusion is completed. This is to minimize the extrusion effect caused by the rough oxidized surface of the billet. This has often resulted in a high rejection



DIE-PRESSED forgings are made in wide variety from several different types of copper-base alloys. These were made by Revere Copper and Brass, Inc.

Forging copper-based alloys (continued)

rate on finished product. Previously the practice to avoid this defect was to stop the operation at the approximate point where the outer skin began to flow through the die as core, leaving a heavy butt end unextruded in the container. This amounted to as much as 20 pct of the billet weight. With the improved method, the operational scrap is only 10 pct or lower.

A defect known as checked rod is also encountered in the extrusion of this group of alloys, usually prevalent at sharp corners of the extrusion. This defect can often be corrected by either reducing the temperature of the billet to be extruded, reducing the speed of extrusion, or by the correction of a faulty die design.

Dies must stand high temperatures

Due to the relatively high temperatures employed in the extrusion of the copper-base alloys, the selection of a die material may be a serious problem. On the more extrudable alloys where medium to long run production is to be attained, the hot work alloy steels are usually employed. The specific group used is the low carbon, tungsten-chromium steels. Within this classification, the carbon is usually between 0.35 to 0.42 pct, the chromium is between 2.5 to 3.5 pct and the tungsten ranges from 9.0 to 14.0 pct.

These alloys have good red-hardness characteristics and high resistance to abrasion and heavy pressures. Their resistance to shock is proportionate to the tungsten content, the lower tungsten steels being more resistant to shock. Where the standard 18-4-1 composition is chosen, the carbon content is often lowered to 0.50 pct in order to obtain additional shock properties. A hardness of approximately 40 Rc is desired.

A die blank having a diameter-to-thickness ratio of 4 to 1 is usually maintained. When in

use, the die is supported in its holder by a backer die having a slightly larger aperture. The great majority of extrusion dies fail due to the aperture becoming smaller as the result of the upsetting pressure on the blank.

All extrusions made from high copper alloys should be cold-drawn to improve their surface which is generally unsatisfactory due to the high extrusion temperatures employed. The more brittle alloys such as the nickel silvers, which have a copper content below 58 pct, cannot receive a cold drawing treatment and so must be used in the as-extruded condition. Cold drawing can also be employed as a forming operation where a U-shape can be extruded as a V-shape and then subsequently cold drawn to form the desired section.

Often production economies dictate the use of preformed slugs in either press or hammer forging techniques. These slugs conform to some extent to the ultimate shape of the forging, so that little metal movement is required to complete the forging. This not only results in an increase of production per man-hour, but also reduces scrap and flash loss as well as realizing maximum die life. These advantages are realized by the use of a preformed extrusion where the completed forging can be produced in a single blow.

Extrusion and forging used

In many instances, in contract forging shops, both extrusion and forging facilities go hand-in-hand, one supplementing the other. In the production of small forgings, it is often found that the use of multi-impression dies, where a number of the same forging can be produced in a single blow, can realize production economies.

The copper-base alloys commonly used in the production of forgings are given in Table II. All of these alloys cannot be cold sheared, so where this is required, shearing should be specified on purchase orders.

Yellow brass accounts for the largest tonnage within the brass forging field due to its relatively low cost. This composition usually has approximately 1.75 pct lead to facilitate machining. Naval brass is used where corrosion resistance is required, such as for marine hardware and valve parts. This composition does not contain lead and consequently it is not free machining.

Silicon-aluminum bronze is strong

Muntz metal is also a non-free-machining alloy employed where strength is an important factor. Its corrosion resistance is less than that exhibited by naval brass. The silicon-aluminum bronze which contains approximately 7 pct aluminum and 2 pct silicon is one of the strongest non-ferrous hot forging alloys on the market. It is also wear resistant, especially when in contact with steel.

In many instances the replacement of brass sand castings with a brass forging has resulted

TABLE II

COPPER ALLOYS FOR FORGING

Metal	Forging Temperature, °F	Probable Range—Mechanical Properties				Cut by Cold Shearing
		Tensile Strength, 1000 psi	Yield Strength, 1000 psi	Elongation in 2 in., pct	Rockwell Hardness	
Electrolytic copper.....	1400-1600	30-38	8-10	45-50	25-65F	Yes
Deoxidized copper.....	1400-1600	30-38	8-10	45-50	25-65F	Yes
Muntz metal.....	1150-1450	45-60	20-30	25-50	35-50B	Yes
Forging brass.....	1200-1500	45-60	20-30	20-35	35-50B	Yes
Naval brass.....	1200-1500	50-65	25-35	35-55	45-60B	Yes
Leaded naval brass.....	1200-1400	50-65	25-35	20-35	45-60B	Yes
High-silicon bronze (A).....	1300-1600	50-65	18-24	50-70	35-50B	Yes
Low-silicon bronze (B).....	1300-1600	40-55	16-22	50-70	30-45B	Yes
Aluminum bronze.....	1450-1600	75-90	33-40	15-30	75-90B	Yes
Manganese bronze (A).....	1150-1450	60-75	35-45	25-45	65-80B	Yes
Manganese bronze (B).....	1150-1450	85-105	55-75	15-30	85-100B	No
Nickel silver 10 pct, leaded.....	1350-1500	65-75	40-50	20-40	62-77B	No

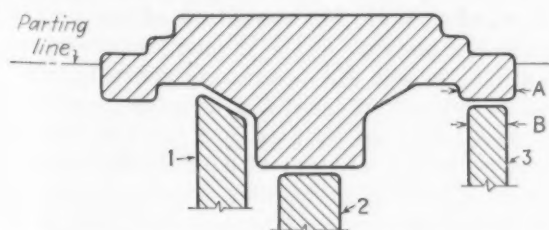
in a decrease of rejects due to the defects, usually encountered in sand casting, of shrinkage and microporosity. In addition, the closer tolerances realized in brass forgings has saved in machining costs and time.

In comparison to a pressure diecasting, a forging will have little advantage where complexity of design is encountered. In production rate, forgings may have the advantage. However, if the part is such that diecasting dies with multiple cavities are feasible, diecasting rates may be higher. For forgings of brass, the average rate is from 200 to 400 cycles per hr as compared to a rate of 100 to 200 cycles per hr in diecasting. However, labor costs are higher in press forging.

Tolerances affect die life

In the design of brass forging dies, the tolerances placed on the finished forging will usually dictate the life expectancy of the die. Where liberal tolerance is permitted, die surfaces can be dressed more frequently before the die must be discarded. In instances where commercial forging tolerances are used, the die is made to conform to the lower limits of the range in order to obtain maximum life expectancy.

Design factors in the forging of the copper-base alloys also contribute to the life of the die.



PLACEMENT of knockout pins is especially important in forging copper-base alloys. Pin 1 is wrong: it should not be on a slanting surface. Pin 2 is properly placed. Pin 3 is well located, provided A is greater than B.

Thus liberal fillets and radii should be specified. Usually a 1/16-in. radius in corners and fillets is satisfactory for press forgings weighing under 1½ lb. But more liberal fillets of 1/8-in. radius or more will realize increased die life. Sharp corners should be avoided since eventually this may lead to washing of the die in those areas, and in some cases it may lead to breakage at the corners.

Forging draft is required to permit ease of ejection of a forging. In hammer forgings, this value is usually between 3° to 7°, depending upon the cavity depth and the complexity of the forging. The value usually given for draft in press copper alloy forgings is between 1° to 5°, though this value will vary with the type of knockout employed. In general, a draft of 3° is the maximum needed. Shrinkage allowance for copper-base alloys is usually between 0.010 to 0.015 in. per in. A flash allowance of 0.035 to 0.080 in. is made.

Ejection pin location critical

If knockout pins are too far from a central point at which a pressing might stick, the copper-base forging may be bent during ejection. Also, these knockout pins should be as large as permissible and balanced on the impression so as to avoid any tendency toward tipping of the part within the die.

Thinner sections are more effectively obtained in a modern forging press than that realized from a forging produced by a series of impact blows. Section thickness should not be under 0.10 in. since the metal will not flow readily in these areas. In addition, the extreme rapidity of cooling may cause the thin sections to fracture.

Part II of this article, covering die casting of copper-base alloys, will be published in a forthcoming issue of The Iron Age.

STEP QUENCHING,

HOT PEENING

improve lean alloys



by R. F. Harvey

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An oil-hardened tool steel was quenched from 1500°F in a 500°F molten salt bath. There it was held above the temperature of martensite formation for a period insufficient for transformation of the austenite. Hot-peening followed, producing a hardness of 84.4 RC. Cracking and weakening effects did not develop.

Formerly, many of our steels were so rich in alloy as to be nearly foolproof. Careful attention to heat treating was not necessary to get satisfactory results. This is no longer true and those responsible for heat treating the lean alloys available today must use other methods.

Experimentation with one such modification of a widely used type of heat treatment has given successful results over the past year.

The basic treatment, variously termed "step quenching," "Martempering" or "Marquenching," is well known.

The term Martempering itself is misleading, as the treatment is a quenching method rather than a tempering operation. In this article the term step quenching will be used. Its use dates back to 1938 when the method was first brought under scientific control¹ as a commercially useful heat treatment. It is based on metallurgical fundamentals derived from our knowledge of the transformation curves. During 1940, step quenching was also investigated in a thesis² at the Worcester Polytechnic Institute.

In the present, modified step-quench treatment, the steel is quenched from above its critical temperature in a molten or hot bath. There it is held above the temperature of martensite formation for a time insufficient to permit transformation of the austenite at that temperature level. This is followed by hot work-

ing the steel while predominantly austenitic.

The hot working may be accomplished by blasting, peening, rolling, swaging, hammering, burnishing, forging or by any other suitable means of mechanical working. Shot peening has been found to be very effective. After mechanical working, the part is air cooled to room temperature. For a diagrammatic representation of the modified step-quenchings see graph.

The intensity of peening depends on the size and material of shot, striking velocity, and the length of exposure of the part to the peening process. A device commonly used to measure the intensity of peening is the Almen test strip, $\frac{3}{4}$ -in. wide by 0.051 in. thick by 3-in. long. It is made from steel heat-treated to 44-50 RC.

Stresses set up by peening one side causes the strip to curve, with the convex surface on the peened side. The curvature of the peened strip is a measure of the intensity of stress set up. This height of curvature is generally measured with an Almen dial indicating gage.

An Almen test strip $\frac{3}{4}$ in. x 0.051 in. x 3 in. was peened to a height of 0.016 in. by conventional cold-peening methods. Another specimen of the same size was peened with the same intensity, but after austenitizing and holding at 400°F for 5 min.

This latter specimen, which was peened at the same time as the specimen on the left under

identical peening conditions, shows an arc height of 0.029 in. Both specimens are made from a high-carbon, oil-hardening, chromium tool steel. Thus, with the same intensity of mechanical working, specimens peened while austenitic and above or within the range of martensite formation show considerably greater curvature. This is taken as a measure of the intensity of compressive stress at surface.

Such an appreciable increase in compressive stress at the surface should be beneficial. It should increase the service life of parts so treated, particularly under repeated stress. This is especially true if the surface stress is obtainable without cracking.

There is no appreciable change in hardness on parts shot-peened by conventional methods. However, shot-peening the steel while austenitic and above or within the range of martensite formation will result in increased surface hardness. This is due to a greater degree of conversion of austenite to martensite than obtainable without mechanical working.

Specimens of oil-hardening tool steel shot-peened as described showed an increase in hardness corresponding to several Rockwell C points. Since this is a rather shallow surface effect, the numerical increase in hardness will depend on the instrument and load used. Superficial or Knoop tests will show a greater numerical increase in hardness than tests using greater indentation loads. Typical results for a non-shrinking, oil-hardening tool steel are

EFFECTS OF MODIFIED STEP QUENCHING

A

Specimen size: 0.396 x 0.396 x 3 in.

Typical analysis, pct: Carbon 0.95
Manganese 1.30
Tungsten 0.50
Chromium 0.50
Vanadium 0.20

Heat treatment: 1500°F—15 min
515°F—5 min in molten salt

Shot blasted immediately on one side while hot

Intensity of peening: 0.016-in. arc height

Hardness	Rockwell A	Equivalent Rockwell C
Blasted side	84.4	65.9
Other side	83.2	63.6

Volume retained austenite, pct: Blasted side 12.3
Other side 19.1

Austenite conversion: 6.8 pct

B

Specimen size 0.140 x 1/2 x 2 1/4 in.

Typical analysis, pct: Carbon 1.04
Manganese 0.80
Chromium 1.20
Molybdenum 0.30

Heat treatment: 1500°F—8 min in molten salt
500°F—5 min in molten salt

Shot blasted immediately on one side while hot

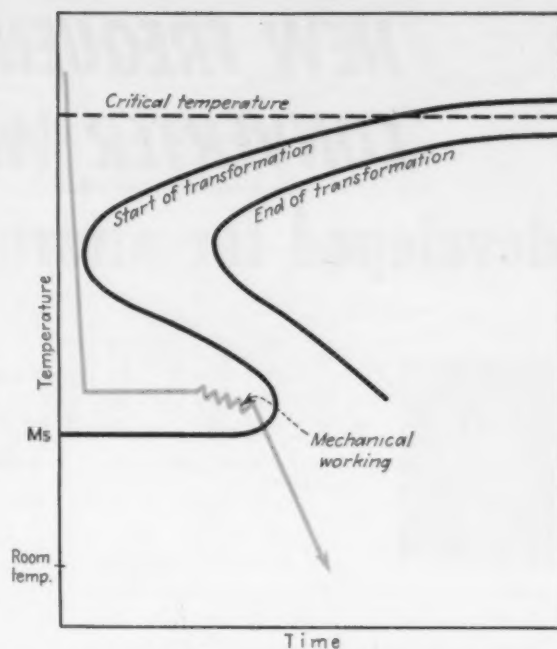
Intensity of peening: 0.016-in. arc height

Hardness	Rockwell A	Equivalent Rockwell C
Blasted side	83.8	64.7
Other side	82.5	62.4

Volume retained austenite, pct: Blasted side 2.4
Other side 11.8

Austenite conversion: 9.4 pct

* Determinations for the volume per cent of retained austenite were conducted at the Massachusetts Institute of Technology by an X-ray method.



DIAGRAMMATIC representation of modified step-quench treatment. Peening is a very effective hot-working method.

shown in the accompanying table. Specimens described there were selected to illustrate effect of different metal thicknesses.

In conventional peening, the right intensity of cold working must be applied. This is often difficult to determine and can cause much difficulty. If the intensity of peening is low the effect is too superficial and very little is gained. Too intense cold work may cause cracks to start, actually weakening the part.³

With the modified step-quench treatment it is believed that higher intensities of peening may be used safely without danger of cracking. In this connection the common practice of avoiding cracks by straightening upon cooling from the hardening temperature will be recalled. It is also believed that the modified step-quenching technique does not require 'hair-line' control of peening intensity.

It has been stated that hot peening causes a greater conversion of austenite to martensite than is possible without mechanical working. Actual determinations of the amount of retained austenite on specimens shot-blasted on one side show this to be true. Tabulated results for two specimens are in accompanying table.

Fatigue tests on springs and specimens as well as impact and other tests are now in progress, but the results are too incomplete to report.

References

- Harvey, R. F., "Hardening Steel," U. S. patent application No. 320,998, filed Feb. 27, 1940.
- Johnson, C. G., and Plutukis, J. J., Thesis No. 1478, Worcester Polytechnic Institute, June 3, 1940.
- Moore, H. E., "Shot Peening and the Fatigue of Metals," American Foundry Equipment Co., 1944.

NEW FREQUENCY CONVERTER WELDERS

developed for aircraft alloys



By F. L. Brandt
Thomson Electric Welder Co.
Lynn, Mass.

Aircraft subcontractors need this information on frequency converter welders developed since the war. War-time welders were fine for aluminum and magnesium, but these new types are needed for high-temperature, corrosion-resistant alloys now used in large quantities.

Many shops are now finding themselves subcontractors on aircraft parts, needing to install new frequency converter welders. The equipment used in World War II was suitable for aluminum and magnesium alloys, but not for the high-temperature alloys too. For all these alloys, Ignitron tube frequency converters welders have been developed since the war.

Tentative standards have been set up by Resistance Welder Manufacturers' Assn. and National Electrical Manufacturers' Assn. for spot-welder frequency welders. There are two types, commercial and aircraft, shown in Table I. Tentative standards for seam welders are now under consideration, and will probably be something like those in Table II.

Both the aircraft and commercial spot converters have a NEMA 7B sequence panel, six

Ignitron tubes, a phase shift heat control, adjustable frequency output, and an inverter circuit to prevent commutation fault. In addition, the aircraft type has a post-heat feature, a forge delay timer, and half-cycle as well as full-cycle firing.

Seam welder converters are roughly the same as spot converters. The sequence timer is replaced by a heat-cool timer. It can be supplied, for aircraft work, with single shot timing with post-heat and forge delay, so that it can be used for continuous operation or roll spotwelding.

These converters operate with low demand and a very high power factor. The throat area and the magnetic material in the throat have greatly reduced effect on power factor as compared to single-phase equipment. Considering one stage of inversion in the converter, a 60-in. throat

TABLE I
SPOT WELDER SPECIFICATIONS
Tentative

	General Purpose Type	Aircraft Type
Pulse time.....	1-5 cycles	1-5 cycles
Inter-pulse time.....	short as possible	short as possible
	non-adjustable	non-adjustable
Weld time.....	3-120 cycles	3-120 cycles
Heat control.....	20-100 pct	20-100 pct
	220-440 v	220-440 v
Post-heat range.....	none	20-100 pct
		220-440 v
Post-heat time.....	none	0-10 cycles
Chill time.....	9-360 cycles*	9-360 cycles*
Temper time.....	3-120 cycles*	3-120 cycles*
Forge delay.....	3-360 cycles*	1-360 cycles
Squeeze time.....	none	3-120 cycles
Hold time.....	none	3-60 cycles
Off time.....	none	3-60 cycles
Anti-polarity.....	no	yes
Flux reset.....	no	yes

* Optional accessory.

TABLE II
SEAM WELDER SPECIFICATIONS
Proposed Minimum Standards

	General Purpose Type	Aircraft Type
Pulse time.....	1-5 cycles	1-5 cycles
Inter-pulse time.....	shortest possible	shortest possible
	non-adjustable	non-adjustable
Heat time.....	3-120 cycles	3-120 cycles
Cool time.....	3-120 cycles	3-120 cycles
Heat control.....	20-100 pct	20-100 pct
	220-440 v	220-440 v
	coarse and vernier adjustment	coarse and vernier adjustment
Post-heat time.....	none	1-10 cycles*
Post-heat range.....	none	20-100 pct*
		220-440 v
Anti-polarity.....	no	yes
Unipolarity with flux reset.....	no	yes
Forge delay time—ac.....	none	1-360 cycles*
Forge delay time—dc.....	none	1-360 cycles*
Squeeze time.....	3-120 cycles*	3-120 cycles*
Hold time.....	3-120 cycles*	3-120 cycles*

* Standard extras.

TABLE III

SPOTWELDING MACHINE SPECIFICATIONS MIL-W-4190 (USAF)

Size	Rating, kva	Throat Depth, in.	Max. Electrode Force, lb	Stroke		Welding Range—Sheet Thickness, in.					
				Working, in.	Addi- tional Retrac- tion, in.	Austenitic & Ni Alloy		Al & Mg Alloys		Plain Steel	
						Min.	Max.	Min.	Max.	Min.	Max.
1-A	50	36	3,000	0-1	3	0.015	0.094	0.020	0.064	0.015	0.125
2-A	100	36	4,000	0-1	3	0.020	0.125	0.020	0.080	0.020	0.188
3-A	100	36	5,000	0-1	3	0.040	0.140	0.032	0.102	0.040	0.219
4-A	150	36	7,500	0-1	3	0.051	0.156	0.040	0.125	0.051	0.250
5-A	150	36	9,100	0-1	3	0.064	0.188	0.051	0.140	0.064	0.312
6-A	200	36	12,500	0-1	3	0.064	0.219	0.064	0.156	0.064	0.374

depth has been found to be a practical maximum.

There are two military specifications on 3-phase machines, MIL-W-4190 (USAF), and MIL-W-15416 (AER). The two are now being combined into one. They are shown in Tables III and IV.

The standard machines in these specifications are of 36-in. throat depth. But physical sizes are increasing due to higher requirements of

welders, if the problem is one of power supply, short throat machines would usually be single-phase. All long throat machines would be 3-phase. If few machines are employed, they would be best if 3-phase machines whether short or long throat.

The wave shape of 3-phase equipment is considered superior for welding aircraft alloys. Welding is done with far less shock, which mini-

TABLE IV

SPOTWELDING MACHINE SPECIFICATIONS MIL-W-15416 (AEF)

Size	Rating, kva	Throat Depth, in.	Max. Electrode Force, lb	Stroke		Welding Range—Sheet Thickness, in.					
				Working, in.	Addi- tional Retrac- tion, in.	Austenitic & Ni Alloy		Al & Mg Alloys		Plain Steel	
						Min.	Max.	Min.	Max.	Min.	Max.
A	50	36	3,000	1/2	3	0.015	0.094	0.020	0.064	0.015	0.125
A	75	36	3,800	1/2	3 1/2	0.020	0.102	0.025	0.080	0.020	0.156
A	150	36	8,700	1	4	0.064	0.156	0.051	0.125	0.072	0.250
A	250	36	11,800	1 1/4	4	0.102	0.219	0.080	0.156	0.102	0.375
A	400	36	20,000	1 3/4	5	0.125	0.250	0.125	0.250	0.140	0.500

new aircraft materials and specifications. Thus 48-in. and 60-in. machines are becoming more and more common.

Machines with 36-in. throats have about 2 1/2 times the welding capacity of single-phase machines with the same kva rating. The 48-in. throats have capacities more than 3 times single-phase machines of equal rating. For 18-in. throat machines, the capacity is equal to that of a single-phase machine of 1 1/2 times the kva rating. Thus with bigger throat openings, the capacity comparison with single-phase machines drawing the same power gets more favorable. Furthermore, the wave shape of their low frequency current has better heating capacity than that of 60-cycle single-phase machines.

Thus in a shop using a large number of

mizes spit and expulsion. And there is minimized heating between electrodes and work which gives longer electrode life and better surface condition of the work.

Machines for welding aircraft alloys must be versatile and are more expensive than ordinary welders. Features such as a repetitive tip dressing release are a must for aluminum alloys. External and internal cooling are used on seam and spotwelders. Jet cooling is often provided because it aids welding of stainless steels.

Based on a paper delivered before Michigan Section, American Institute of Electrical Engineers, earlier this year.

SAE STEEL COMMITTEE

leads alloy conservation program

Boron steels account for 8 pct of alloy production . . . Armed Services plan long range boron steel research . . . Gear makers having distortion troubles with carburizing grades.

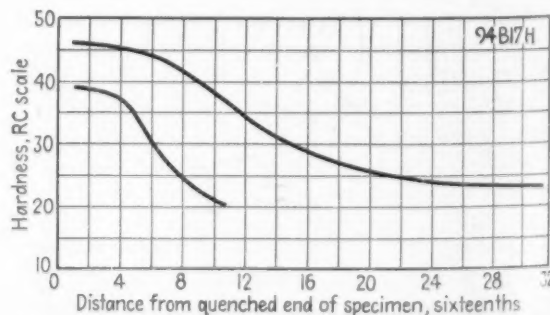
Just nine months ago Div. VIII of the SAE Iron and Steel Technical Committee was formed. Under the leadership of Chairman H. B. Knowlton, International Harvester Co., and E. H. Stillwill, Dodge Div., Chrysler Corp., the use of boron steels has jumped from practically zero to 8 pct of our present alloy constructional steel production. By 1st quarter this figure will be 10 pct, which represents a considerable savings in strategically short alloys like nickel, molybdenum and chromium.

From meetings of a few dozen the Div. VIII meetings have grown to 100 to 200 in attendance. These men represent the leading alloy steel users and makers and are a cross-section of the country's top alloy metallurgists.

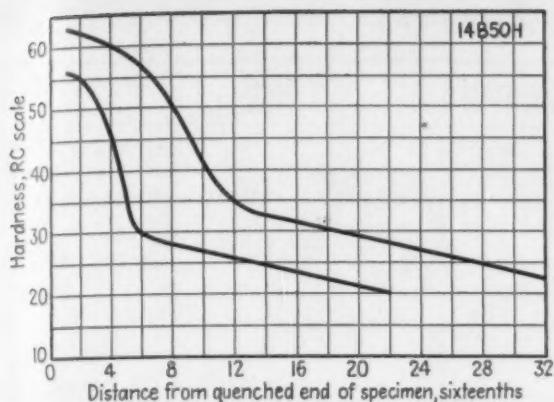
Since Div. VIII started working with the alloy Steel Bar Committee of AISI, chairmaned by Porter Wray, U. S. Steel Co., 14 new steel types in 86 separate grades have been created and standardized and are in use. All these alloys are not boron steel but all are lean compositions calculated to replace the highly alloyed grades.

At Div. VIII's last meeting in Detroit, Dec. 4, 14 new grades were announced as standard AISI-SAE steels as shown in the table. Also the 5 boron steels shown here were formally accepted as H-band grades.

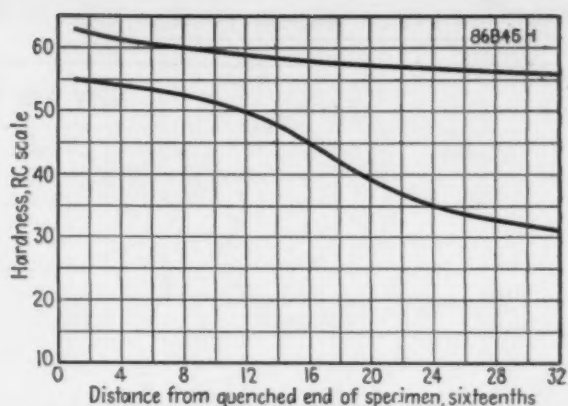
Serving as a clearing house for all boron steel developments and research the Air Force and the Ordnance Dept. reported to the meeting



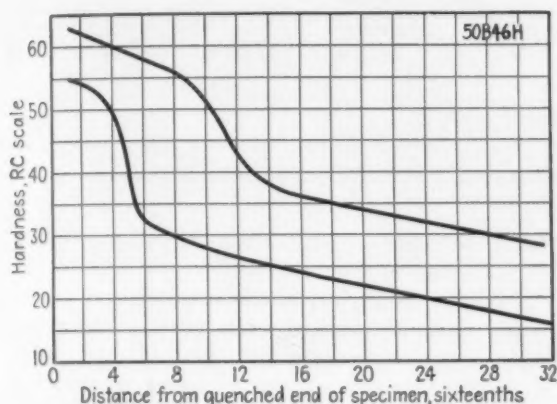
NOW A STANDARD H-Band steel, 94B17 is popularly used to replace carburizing grades of the 4800 and 4600 series steels. Most use has been in gears and pinions.



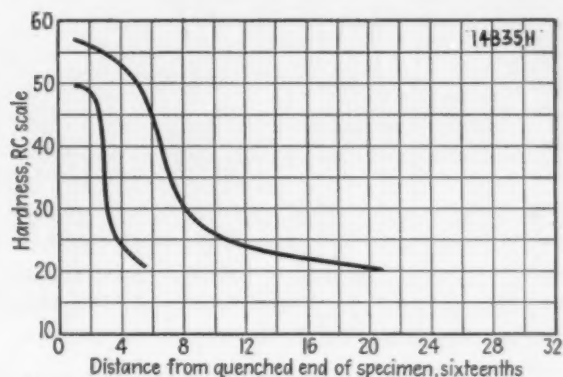
14B50-H has been used for years for heat treated bolts and small tools. This grade and 14B35-H will probably be the only 14BXX series put on the H-Bands.



INTENDED as a replacement for 4340, this grade is widely used in tractor and truck axles. 86B45-H also replaces former applications of 8640-H steels.



THE HARDENABILITY band for 50B46-H is somewhat overdue. For years this grade has been used to make diesel crankshafts and automotive hand tools.



14B35 is intended for cold headed bolt applications up to 1/2 in. diam replacing 4037 steel. This grade has also been used for coil springs replacing 8650-H grade.

on their particular programs involving boron steels. The Metallurgical Advisory Board denoted the services of Dr. McBride, who delivered an excellent paper summarizing all progress to date.

Although the automotive truck and tractor industry has led the parade in using the new grades, other important segments of industry are fast becoming active. The Aircraft Industries Committee, Mr. Badger, General Electric Co., told the meeting, is sponsoring a program to make boron steels available in aircraft quality. Five grades will be melted and warehoused. These five grades in AQ will be 81B30, 98B40, 94B17, 80B40 and 43BV10. The petroleum and chemical industries are cooperating. Three new grades for rock-bit cutters are now standard steels. They are TS 46B12, TS 4613 and TS 4618. These steels replace the old 4800 series for such applications, thus saving substantial amounts of nickel and molybdenum.

Basic as well as applied research is going forward under Div. VIII guidance into all phases of lean alloys. U. S. Steel and Timken Roller Bearing Company investigated temper brittleness of chromium-molybdenum-boron and

reported no difference in temper brittleness tendencies of their grade and a standard 4142 steel. Also grades TS 86B40, TS 81B40, TS 4140 and TS 94B40 show no difference in Izod impact values whether water quenched or slowly cooled after tempering in the brittle range. The TS 4140 grade, however, is considerably more susceptible to temper brittleness than the standard 4140 Steel as measured by Izod impact tests.

Although boron steels have been successfully applied in many applications with as good or better results than standard steels, the carburizing grades of boron steels are still giving the gear makers some headaches. The biggest difficulty has been distortion, particularly in small gears of their section. Bore closures are much more excessive than was expected. Tooth movement with or without fixture quenching is greater than normal and general distortion varies so much that each heat requires a pilot lot trial to learn the proper adjustment necessary on the gear cutters before processing each heat into gears.

Wider differences between core and carburized case hardenability is believed to be the

NEW AISI ALLOY STEELS

Grade	C	Mn	Si	Ni	Cr	Mo	Use
4118* Mod.	0.18/0.23	0.70/0.90	0.20/0.35	.....	0.40/0.60	0.08/0.15	Ring gears
5155*	0.50/0.60	0.70/0.90	"	.....	0.70/0.90	.....	Springs
TS4813	0.10/0.15	0.45/0.65	"	1.65/2.00	.....	0.25/0.35	Restricted to rock bit cutters
TS4818	0.15/0.20	0.45/0.65	"	1.65/2.00	.....	0.25/0.35	
TS14B35†	0.33/0.38	0.75/1.00	"	.....	.....	.....	Bolts
TS14B50†	0.48/0.53	0.75/1.00	"	.....	.....	.....	Bolts
TS40B37†	0.35/0.40	0.70/0.90	"	.....	.....	0.08/0.15	Bolts, place type
TS43BV12**†	0.08/0.13	0.75/1.00	0.20/0.40	1.65/2.00	0.40/0.60	0.20/0.30	Aircraft
TS43BV14**†	0.10/0.15	0.45/0.65	0.20/0.35	1.65/2.00	0.40/0.60	0.08/0.15	Hvy duty trucks
TS46B12†	0.10/0.15	0.45/0.65	"	1.65/2.00	.....	0.20/0.30	Rock bit cutters
TS50B50†	0.48/0.53	0.75/1.00	"	.....	0.40/0.60	.....	Truck axles
TS50B60†	0.55/0.65	0.75/1.00	"	.....	0.40/0.60	.....	Springs
TS80B37†	0.35/0.40	0.75/1.00	"	0.20/0.40	0.20/0.35	0.08/0.15	Bolts, over 9/16"
TS81B40†	0.38/0.43	0.75/1.00	"	0.20/0.40	0.35/0.55	0.03/0.15	Steering knuckles and axles

* New standard steel.
 ** Contains 0.03 pct V, min.
 † Can be expected to contain 0.0005 pct B, min.

culprit in some instances. In cases the distortion can be licked by dropping the initial carbon level, i.e. 94B17 instead of 94B20 or by decreasing the carbon in the carburized case. However, the machinability of the lower carbon parts is not always good.

One company has switched from 94B17 to TS 8123 (resulfurized) to get better machinability and less distortion on smaller sized ring

gears. Another company dropped 80B20 in favor of 8126 for similar reasons.

Overall, the technical advancements of boron steels have progressed even further than has their application since Div. VIII started. NPA is starting to crack down on users so that the production tonnage of boron should increase sharply next year. The next general meeting of Div. VIII will be held in March.

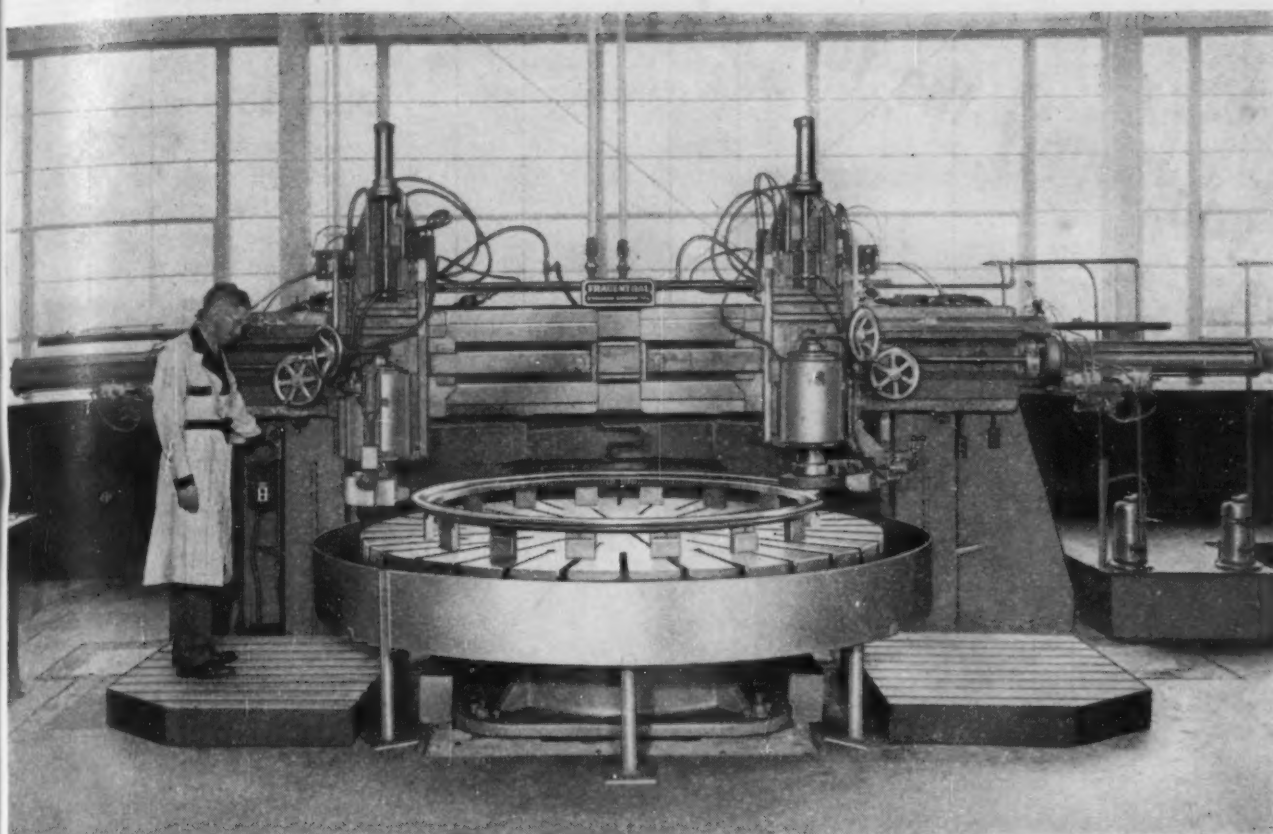
NEW BOOKS

"*Chemical Analysis of Cast Iron and Foundry Materials*," by W. Westwood and A. Mayer. The chemist handling routine chemical analyses of metals used in modern foundry practice, and the research chemist, will find this volume useful. The book deals with sampling and analysis of iron, ferro-alloys, iron-ore, slags, silica, coal and coke, and the analysis of coal and coke ash. Methods of calculation, range and accuracy are given for each method. George Allen & Unwin Ltd., Ruskin House, 40 Museum St., London, W.C.. \$5.88 (42s). 565-p.

"*Ten Thousand Commandments*," by Harold Fleming. "A Story of the Antitrust Laws" is the subtitle of this book by a business reporter. It is written for laymen rather than lawyers, and traces the growth of "anti-trust" from the original Congressional law through the maze of legal entanglements and supreme court rulings which have in effect rewritten the law. Prentice-Hall, Inc., 70 5th Ave., New York 1, N. Y., \$2.25. 206-p.

"*Steels In Modern Industry*," by W. E. Benbow. Written with an eye for steel conservation, this volume on modern steels, their uses and properties has been keyed to the needs of designers and engineers. An introductory section briefly discusses basic metallurgy. Twenty-nine specialists have contributed to the 25 sections, each of which tells concisely the properties of various steels, their treatments, and their applications. Iliffe & Sons, Ltd. Dorset House, Stamford St., London, S.E. 1. \$5.88 (42s). 562-p.

"*1951 Bituminous Coal Annual*." For the fourth consecutive year the Bituminous Coal Institute is distributing its interesting volume of vital coal industry statistics. Beginning with a panorama of coal and the industry as a whole, the annual covers in detail such subjects as energy, reserves, production, transportation, markets, labor, safety, research and finance. Bituminous Coal Institute, 320 Southern Bldg., Washington 5, D. C. 204-p.



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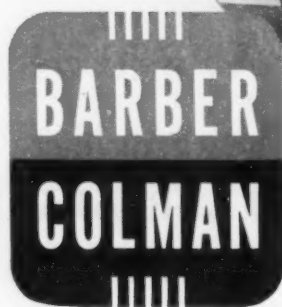
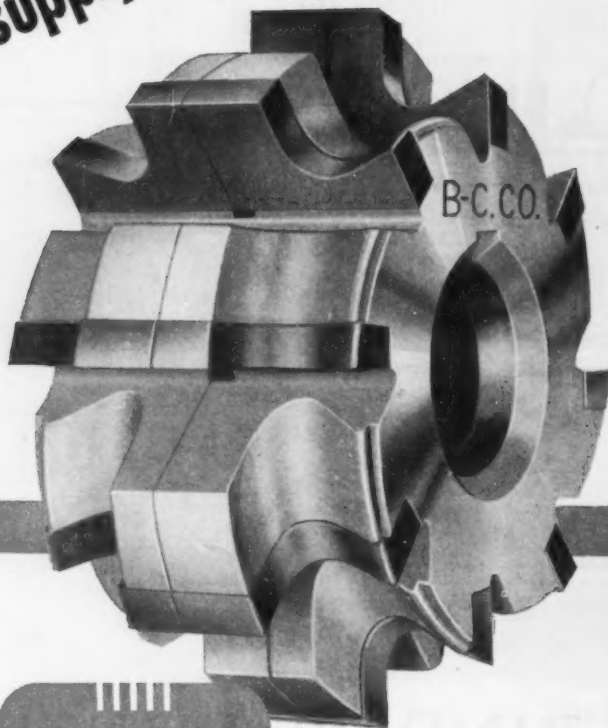
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Oil, grease seals

An exhaustive 100-p. catalog of Garlock Klosures, oil and grease seals for bearings, has been prepared. The general engineering data are organized to permit ready use of the catalog in determining appropriate sizes and types of closures to meet a variety of conditions. *Garlock Packing Co.*

For free copy insert No. 15 on postcard p. 83

Sling, riggers manual

A comprehensive sling and riggers manual has been prepared by Union Wire Rope's technical staff. Types of slings, sling fittings, methods of rigging, and methods of splicing wire rope—in step by step drawings—are described in the 48-p. manual. *Union Wire Rope Corp.*

For free copy insert No. 16 on postcard p. 83

Hand trucks

A new folder illustrates and describes the Fairbanks line of steel framed hand trucks. Features are the 9000 Series 2-wheel hand truck and a number of special purpose trucks. The circular indicates the wide line of materials handling equipment available for every requirement. *Fairbanks Co.*

For free copy insert No. 17 on postcard p. 83

Shop equipment

A new folder describes the Hallowell line of steel shop equipment. Included are pictures, details and shipping weights of cabinet benches, work benches, drawers, shop desks, cabinets, tool stands, carts, stools and chairs. *Standard Pressed Steel Co.*

For free copy insert No. 18 on postcard p. 83

Ultra-thin metals

Aircraft and electronic industry demands are for stronger alloys rolled to extremely thin gages. Precision rolled metals and unusual combinations of clad metals are described in a new folder. *American Silver Co., Inc.*

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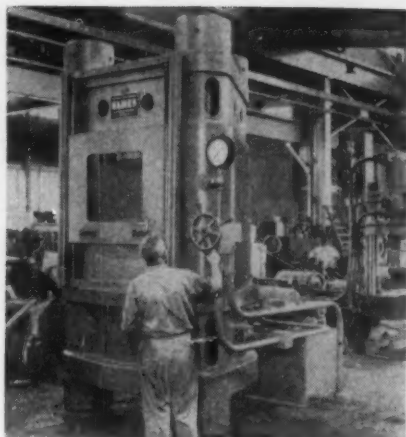
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NEW equipment

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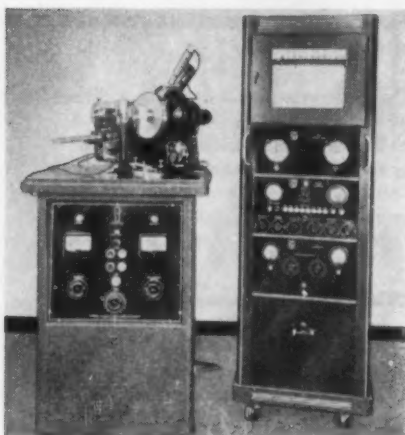


Hobbing press used for die quenching

A hydraulic hobbing press of 2500 tons capacity has been designed for a leading manufacturer of aircraft gas turbine engines and accessories. Ordinarily, hobbing presses are used for sinking desired impressions into blocks of prepared steel, thus forming duplicate die inserts, multi-cavity molds, and single molds with intricate contours. In the case of this manufacturer, the presses will be used primarily for die quenching. This operation involves a quick-cooling

of hot forgings while restrained in a die under extremely high pressure, thereby maintaining maximum accuracy while developing high physical properties. General specifications of press illustrated: Weight, 50,000 lb; overall height, 10 ft 8 in.; between columns, 1 to 39 in.; stroke, 15 in.; opening, platen to head, max 32 in.; speeds, advance 10 ipm, press 1/2 ipm, return 20 ipm. *Elmes Engr. Div., American Steel Foundries.*

For more data insert No. 19 on postcard, p. 83



Spectrometer used for powder diffraction work

Three components comprise an improved X-ray diffraction spectrometer: basic X-ray diffraction unit; wide-range Geiger-counter goniometer; electronic circuit panel with strip chart recorder. The instrument is used for X-ray powder diffraction work and fluorescence analysis and incorporates an X-ray optical arrangement which gives extremely high resolution. The basic X-ray diffraction unit operates on 200-240 v, ac, 50 or 60

cycles, with full-wave rectification and facilities for visual indication of tube functioning. The goniometer scans and analyzes X-ray diffraction spectra of specimen materials by divergent-convergent beam focusing geometry and provides accurate measurement of angles from -38° to $+180^\circ$, with X-ray diffraction range from 38° to 165° . *North American Philips Co., Inc.*

For more data insert No. 20 on postcard, p. 83



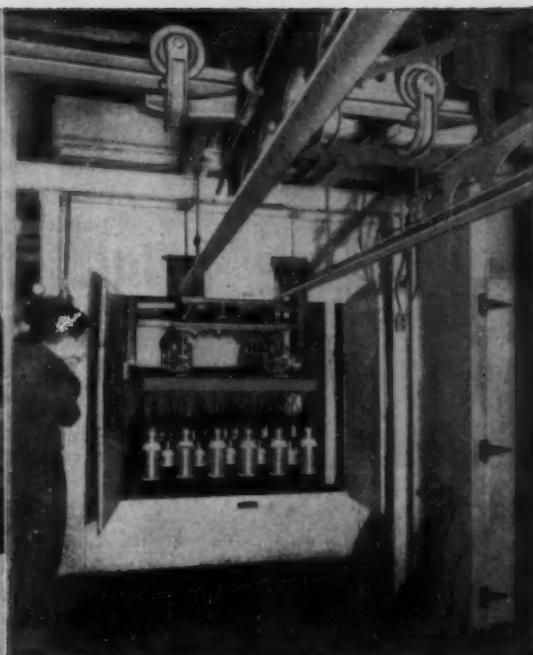
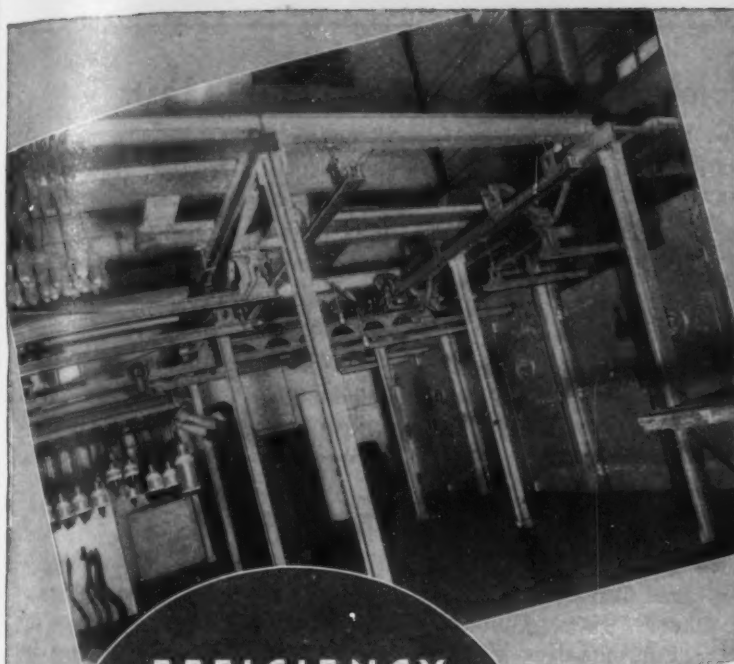
Heavier gas powered trucks are stand-ups

None of the maneuverability features of the smaller Mobilifts has been sacrificed in the new H series 3000 and 3500-lb capacity gas powered trucks. They feature the exclusive Lev-R-Matic drive, which gives the operator finger-tip, push-pull control of forward-back movement, tilting and elevating. A heavier duty multiple disk clutch smoothly transmits power without

any manual gear shifting. Outside turning radius for the H model is $61\frac{3}{4}$ in.; $63\frac{7}{8}$ in. for the HW. Both are powered by Mobilift's three cylinder air cooled gas engine, with a governed speed of 6 mph. Speed of lift loaded is 50 fpm with the proven Mobil-Chain lift. Standard 63 and 83-in. masts are available. *Mobilift Corp.*

For more data insert No. 21 on postcard, p. 83

Turn Page



**EFFICIENCY
AND CLEANLINESS
INTRODUCED IN
VARNISH INSULATING
DEPARTMENT**

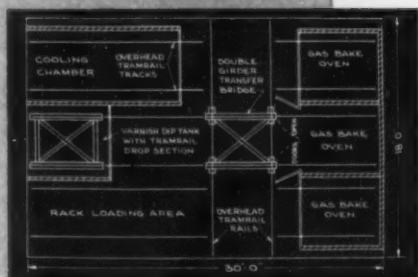
Tramrail rack carriers handle up to 72 armatures per load through the varnish dip tank, bake oven and cooling chamber.

Rack loads of armatures are dipped into the varnish tank with the tramrail drop section.

The installation of a simple Cleveland Tramrail system in the varnish insulating department of D. W. Onan & Sons, Minneapolis, large manufacturers of electric generating plants, has made this one of the most compact and efficient departments of its kind. Complete insulation applications are given to the large production of armatures, stators and field coils in a space only 18 by 30 feet.

Prior to installation of the tramrail system, work in this department was hot, sticky and unpleasant. Workers had to wear long heavy gloves and protective aprons. After a time the floor racks, then used, would become coated with varnish several inches thick. Today the department is spic and span. The work is clean and easy. No hand handling is required until the varnish treatment is complete and the parts dry.

The tramrail system has eliminated a tremendous amount of rehandling and thereby saved time, speeded production and cut costs.



The rack carriers can be transferred by means of the double-girder transfer bridge to any of the six runways shown.

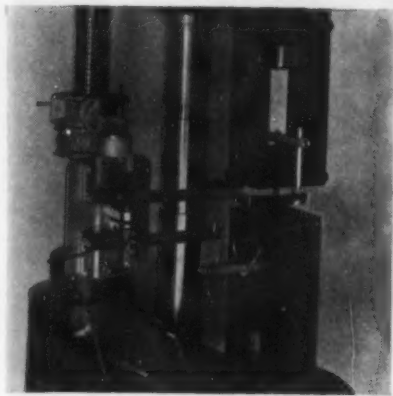
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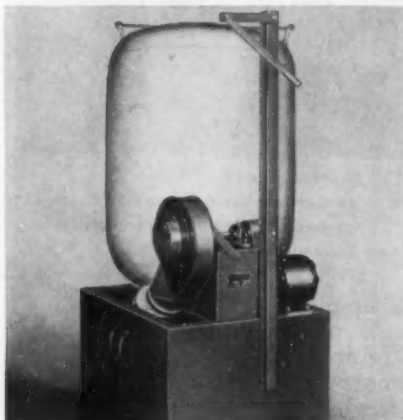


Extensometer contacts ends of bolt in tests

A new type bolt extensometer has been designed for accurate tensional tests of bolts without the influence of shifting of grips or seating of the specimen. The instrument contacts the center of the ends of the bolt, making direct and exact measurements of elongation. If the extensometer is left in position until actual fracture of the bolt, a complete load-elongation curve can be obtained, showing

ultimate strength and overall elongation. Loading frames of 50,000 lb capacity accommodate up to 3/4-in. bolts. The instrument is Microformer type, employing variable miniature transformers. A specially designed bracket supports the extensometer on an unstressed column of the testing machine. *Baldwin-Lima-Hamilton Corp.*

For more data insert No. 22 on postcard, p. 83

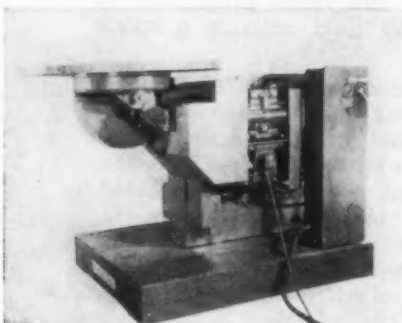


Low cost dust collector operates on 25 cycles

Dustbuster is a low cost, big capacity self-contained dust collector for use with sanders, saws, jointers, planers, etc. For operation on 25 cycle power, a V-belt drive through a counter shaft permits a self-clearing paddle wheel fan speed of nominal 3600 rpm to maintain rated 633 cfm suction. The Model JS has a 1/3 hp, continuous duty motor mounted on a cabinet that encloses a caster-mounted, heavy duty trash can of 31 gal capacity. Cabinet has

a frame which is both a support and a filter shaker for an oversize cloth filter. Discharge from the blower tends to throw the heavier dust into the can. Finest dusts are taken out by filter and cleaned air returns to the working space. Set-up requires only bolting of uprights to cabinet, connection to electrical power, and completing the connection between inlet of collector and source of dust. *Aget-Detroit Co.*

For more data insert No. 23 on postcard, p. 83

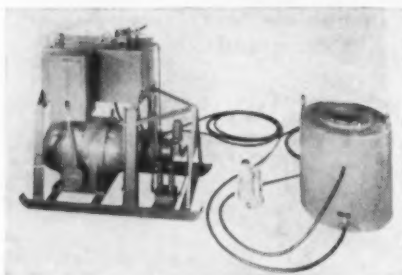


Welding positioner has variable, constant speeds

The table of a precision automatic welding positioner rotates at an infinitely variable speed from 0 to 2.7 rpm, and at 4 rpm constant speed for quick positioning. Either speed is immediately available on a remote pushbutton control station. Precise table speeds are indicated on an electric generator

tachometer. The rotation motor is running during the welding cycle, allowing instant start and stop of the table through electric clutches and brake. The table tilts 135°. Capacity is 5000 lb. Grooved casters permit it to be guided on a track. *Aronson Machine Co.*

For more data insert No. 24 on postcard, p. 83

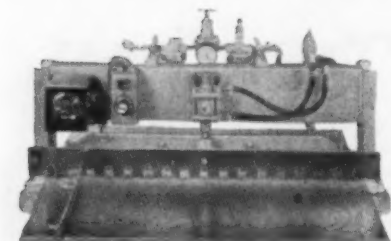


Center-hole puller has 600 tons capacity

This large tonnage hydraulic jack operates by a 10 hp motor and is double acting for use in large electric plants. Weight of ram is 1750 lb. Two hand pumps are incorporated. After desired tonnage is run up with motor, extra tonnage can be added gradually with hand

pumps. Outside diameter is 22 in.; height, 21 in. 6 1/2 in. travel is provided in 7 3/4 in. center hole. The Jenny center-hole principle eliminates torque. Unit pushes or pulls in a straight line, vertically or horizontally. *Templeton, Kenly & Co.*

For more data insert No. 25 on postcard, p. 83



Jaw heat sealer handles wide material

For the manufacture and final closure of large bags, pouches, interliners, etc., made of kraft and scrim-backed laminates, pliofilm, foil used for military and industrial packaging, a new 38-in. Jumbo jaw heat sealer has been developed.

Sealing bars 38 in. long seal 36-in. standard width material. The machine is powered by compressed air and all sealing functions are under automatic control. *Pack-Rite Machines.*

For more data insert No. 26 on postcard, p. 83

Strike Fear Turns Steel Market Into a Turmoil

Customers put on pressure for "quick" steel . . . Even short steel shutdown would smash government programming . . . Scrap need becomes desperate . . . Some mills are borrowing.

Early this week strike fear had turned the steel market into a turmoil. Near-hysterical efforts of consumers to get "quick" steel reflected their uncertainty of future supply. There was a rush of telephone calls, telegrams and visits to see if needed metal could be squeezed out before a Jan. 1 strike could ring the curfew on production. Another strike hedge was seen in renewal of interest in premium-priced metal.

Even a short steel shutdown would smash to smithereens all the production programming of the government. To avoid excessive damage, furnaces would have to be banked in advance of the strike deadline, and it would take at least 3 days to get back into full production after workers returned. Loss of even a week's production would total more than 2 million tons of steel ingots.

Big Shuffle — But consumers who had seen it happen before knew that strike losses would set off a chain reaction which would cause them to be greatly magnified. Production, fabricating and shipping schedules would be disrupted. All chance of early stability in the Controlled Materials Plan would be lost. And market emphasis would shift to worthless CMP tickets which would create a multitude of hardship cases.

The rescheduling job would be terrific—for mills and government alike. And many customers who thought they were safely on mill schedules would find themselves caught in the shuffle.

Hope for Peace—Main hope for steel peace was based on urgent national need. Union strategy had committed it to a mandatory policy of "no-contract-no-work." And, although there seemed hardly a chance that it could win a "satisfactory" contract before time runs out Dec. 31, it was expected the workers would respond to a back-to-work plea from the White House. None of the parties could afford the responsibility for a long tieup of steel production.

Regardless of what results from wage mediation efforts, plates, structurals and bars are bound to be in tight supply for many months. These are the products from which defense and supporting industries are taking the biggest bites. No letup in demand for these best sellers is anticipated in the foreseeable future.

Cut Costs—Some other products, such as cold-rolled sheets, have been showing signs of softening for several weeks. Gray market and premium prices have encountered consumer resistance (strike-hedge interest notwithstanding), and the biggest conversion sheet users will be pretty well out of the market by the end of the year. It should be noted that bar and plate conversion is continuing, and additional deals are being sought.

Getting out from under sheet conversion costs is providing a handy windfall to some auto makers whose margins have been cut by falling volume of output. Assuming a car maker has been using 25 pct conversion steel and

paying a premium of \$100 a ton, dropping all conversion for a car containing 3000 lb of steel could mean a potential saving of \$37.50 per car. The saving could be even greater if it is assumed that the conversion steel did not work as well in the presses, resulting in more scrapped parts.

Borrowed Scrap — Need for scrap is desperate. Early this week some mills had exhausted their own stocks and were operating with borrowed scrap. They had promised to repay the loan in the first quarter of 1952.

Cold, snow and ice which have gripped major steelmaking centers for the past 2 weeks are a serious deterrent to scrap collection. Some collections were reduced more than 50 pct. Mills are working blast furnaces to the limit in an effort to replace as much scrap as possible with hot metal charge in their openhearth.

The bad weather also hampered steelmaking operations, although production losses were slight. Transportation lines became clogged, as rail and truck shipments were delayed. Some snow-bound workers had a hard time getting to their jobs, and interplant movement was slowed.

Holiday Output — Steelmaking operations this week are scheduled at 101.0 pct of rated capacity, down 3.5 points from the previous week. Most mills were hoping to get near-maximum output through the Christmas holidays. They were under strong pressure to deliver every ton of steel possible before Jan. 1. Total output for 1951 is expected to exceed 105.2 million net tons.

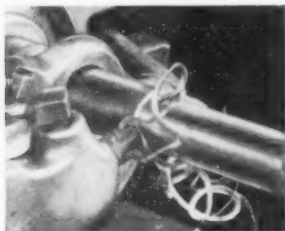


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information that helps you
find hidden plant capacity!



Ordinary lighter flints held the secret

For years industry had sought a way to broaden the use and capacity to produce many strategic corrosion and high heat resistant steels, by improving their hot workability. Carpenter **A-E-Service** hit the secret... applied Cerium, a rare-earth element heretofore used chiefly in ordinary cigarette lighter flints.



Making a "nickel" work easier

"Working" or machining 36% nickel alloy parts used to be a pain in the neck to industry. Then **A-E-Service** went to work for Carpenter customers. Result: Free-Cut Invar "36" was invented. Now 36% nickel alloy parts are machined faster, easier, and many new uses are now possible.

There's a reason why many plants are finding hidden plant capacity to meet higher production quotas these days. They're getting *more* from present machinery and manpower, because of Carpenter's **Application Engineering Service**.

A-E-Service is Carpenter's way of working with customers to get maximum returns from every job involving specialty steels. That's why it's a revelation to watch the Carpenter man at work. He digs for every bit of data he can get. He analyzes the job, notes previous performance records, asks a lot of questions. Result: He's equipped to intelligently recommend the

one steel best fitted for top performance.

And **A-E-Service** is more. It involves in-the-shop counsel by field engineers to spotlight opportunities for more output. When necessary, it puts a pioneering staff of laboratory technicians on the job. In answer to customers' needs, this is the same staff that invented the first free-machining stainless, the first low temperature air-hardening die steel, the first chrome-nickel alloy steel of its kind in the world.

This is Carpenter **A-E-Service**... an entirely different concept of service on specialty steels. You can count on it now and in the days ahead.



**keeps you
ahead of competition**

THE CARPENTER STEEL COMPANY • READING, PA.
Pioneers in improved Tool, Alloy and Stainless Steels through continuing research

Market Briefs

appliance hopes—General Electric Co. hopes to produce three-fourths as many appliances during 1952 as they did this year despite material shortages, according to Ralph J. Cordiner, president. About 20 pct to 25 pct of the company's current billings are for defense items, but in 1952 this is expected to increase to about 30 pct and then level off, he reported.

R.R. scrap—Shipments of scrap by the nation's railroads are expected to average more than 400,000 tons a month over the next several months, according to the Assn. of American Railroads. October shipments by rail systems totaled more than 325,000 tons of normal scrap and 100,000 of dormant scrap, it was reported. A "liberalized" policy of scrapping obsolete and worn-out locomotives will be continued.

opposes rise—Office of Price Stabilization is protesting the 9 pct truck rate increase scheduled to become effective this week on hauls from the New England and Middle Atlantic states to the Midwest. Eastern Central Motor Carriers Assn. is backing the Interstate-Commerce-Commission-approved rise but OPS says the 915 carriers involved haven't shown their need for it.

African iron—British, French and Canadian interests have signed an agreement on the prospecting and exploitation of the iron ore fields in French Mauretania, West Africa. French interests will have a majority holding. It will be necessary to build a railroad to the coast.

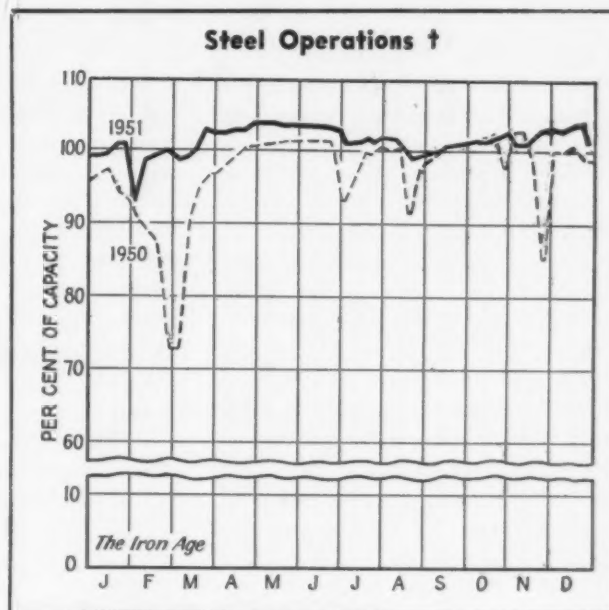
power use—Sales of electric power by large private utility companies were 8 pct higher in October than they were a year ago, Federal Power Commission reports. The firms took in \$442,926,000 in October, 1951, as compared with \$409,953,000 in October, 1950.

labor preference—A priority at state employment offices has been extended to the Great Lakes shipbuilding industry because of its serious labor shortage. Instructions from the Labor Dept. advise offices in three states cover Great Lakes shipyards generally and American Shipbuilding Co. and Great Lakes Engineering Co. particularly.

ship line—John L. Lewis has announced that the United Mine Workers and the soft coal operators have joined in proposing to the government the formation of an industry-union shipping corporation to develop a long-term, worldwide coal export trade. The union president said he believed present freight rates were too high, and that the proposed combine could put American coal on a more competitive basis with little help from government subsidies.

average rate—The steel operating rate of U. S. Steel Corp. for the whole of 1951 averaged approximately 101.5 pct of rated capacity, and in recent weeks has averaged close to 105 pct of capacity. Shipments in 1951 will approximate 24,250,000 net tons of finished steel products. This is 7.1 pct more than the 22,635,000 tons shipped in 1950, best previous year and 15.2 pct above our record wartime shipments of 21,052,000 tons in 1944, according to board chairman Irving S. Olds' year-end report.

new record—More fabricated structural steel has been shipped in 1951 than in any of the past 20 years, according to American Institute of Steel Construction. And 1952 looks like another peak year. Shipments this year totaled 2.7 million tons.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Dec. 16,	101.0*	98.5	103.0	101.5	105.0	104.0	100.5	109.0	104.0*	104.0	95.5	93.5	106.0	104.5
Dec. 23,	100.0	105.0	103.0	95.5	100.0	104.0	89.5	106.0	104.0	104.0	77.5	93.5	103.0	101.0**

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.

* Revised.

** Tentative.

New Lead Controls Issued, Coming

Battery makers limited to types, quantities . . . May limit scrap inventories, speed generators' shipments . . . GE turns permanently to aluminum for some uses—By R. L. Hatschek.

National Production Authority anticipates an annual saving of 5000 tons of lead to result from order M-93, issued last week. The new order limits car battery manufacturers to five standard types with amp-hr ratings from 90 to 135.

The battery makers, largest users of lead, will be permitted to produce only as many batteries of each type as they did in the same month of last year. Any producer who made batteries above or below the approved amp-hr ratings will be permitted to add that number to his 1951 production of the approved types. Effective date of the order is Mar. 1, 1952, and it applies only to car batteries.

May Limit Inventories—The agency has recently been discussing with industry representatives a proposed order which would establish inventory control over lead scrap and battery scrap in the possession of dealers. The order, in effect, would require movement of such scrap from dealer yards within specified periods. A second provision would require generators of lead scrap to ship it to dealers either as soon as it accumulated in carload quantities or every 30 days.

Industry members objected to

a proposed provision that smelters and refiners be required to smelt into secondary soft lead a specific percentage of battery scrap receipts. It is feared, however, that without such a provision a surplus of antimonial lead might develop.

Lead Output Rises—October production of recoverable lead from domestic mines totaled 33,133 tons, an increase of 5480 tons over the preceding month, but still not up to the 1950 average. This brings the 10-month 1951 total to 327,867 tons and probable production for the entire year to approximately 396,000 tons. Production in 1950 was 430,824 tons.

But imports, which provide about a third of the lead consumed in this country, just aren't up to snuff. The government will soon be allocating foreign lead as well as domestic, but trade sources feel that dropping imports will throw the schedule off. Reason for the falling imports, of course, is the 19¢ per lb ceiling placed on foreign metal by the Office of Price Stabilization in October.

Acheson on Tin?—It was rumored in tin circles last week that U. S. government talks on tin with

Bolivia were to be resumed and it was later reported that Secretary of State Dean Acheson might step in to attempt straightening out the price dispute between the Bolivians and Reconstruction Finance Corp. He, in turn, may put the problem up to the President. Industry is hoping for the resumption of tin buying—it doesn't like the "water, water everywhere" situation it is now in.

Aluminum Moves In—General Electric Co. plans on maintaining a 75 pct production rate on appliances despite only a 40 pct copper supply. The company is doing this by means of alternate materials, primarily aluminum. Vice-president Roy W. Johnson states that quality is unaffected and "in most instances we will never go back to materials for which we have found workable alternates."

According to another GE spokesman, the firm has successfully used aluminum as a substitute for copper in heavy industrial machinery. The switch has been permanently made in distribution transformers and it is possible, says this executive, that aluminum might eventually also be used in power transformers. The present price advantage enjoyed by aluminum is a factor in decisions of this nature.

Opposes Copper Hike—Company officials also went on record as being opposed to higher prices for foreign copper. Board chairman Philip D. Reed agreed that increased prices would not substantially increase copper supplies and pointed out that they would result only in increased end-product prices.

But substitution of aluminum for copper presupposes an ample supply of the lighter metal and, while total supply will definitely be greater in 1952, substantially increased military requirements will choke off much of the civilian supply.

NONFERROUS METAL PRICES

	Dec. 19	Dec. 20	Dec. 21	Dec. 22	Dec. 24	Dec. 25
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	.....
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	.....
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	.....	\$1.03	.....
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	.....
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	.....

*Tentative

Note: Quotations are going prices.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 62S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 62S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 62S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate 1/4 in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 62S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 34.3¢ to 74.5¢; 12 to 14, 36.9¢ to 59¢; 24 to 36, 59.6¢ to 1.16; 36 to 38, 47.2¢ to 1.70.

Red, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 43.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-TS, 1/4 to 1 1/8 in., 53.5¢ to 42¢; 1/2 to 1 1/2 in., 41.5¢ to 39¢; 1 3/4 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Colled, 0.051 to 0.374 in., 2S, 34.4¢ to 39¢; 62S, 48¢ to 35¢; 54S, 51¢ to 44¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 54¢ to 67.5¢.

Extruded Tubing: Rounds: 63-S-T-5, OD in. 1 1/4 to 2, 37¢ to 54¢; 2 to 4, 38.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 73 in., 1.42¢; 96 in., 1.52¢; 120 in., 1.90¢; 144 in., 2.28¢. Gage 0.24 x 28 in., 73 in., 1.97¢; 96 in., 1.89¢; 120 in., 2.29¢; 144 in., 2.75¢. Colled Sheet: 0.019 in. x 28 in., 25.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: F51-O, 1/4 in., 68¢; 3/16 in., 66¢; 1/2 in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 76¢; 16, 85¢; 18, 93¢; 20, 1.05¢; 22, 1.27¢; 24, 1.67¢. Specification grade higher. Base: 50,000 lb.

Extruded Round Rod: M, diam in., 1/4 to 0.311 in., 74¢; 1/2 to 1/4 in., 57.5¢; 1 1/4 to 1.749 in., 59¢; 2 1/4 to 5 in., 48.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb; 1/4 to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.28 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.0 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/4 lb, 10,000 lb, 1/4 to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam in., 0.049 to 0.087; 1/4 in., 57¢; 3/16 in., 57¢; 1/2 in., 57¢; 3/4 in., 57¢; 1 in., 57¢; 1 1/4 in., 57¢; 1 3/4 in., 57¢; 2 in., 57¢; 2 1/4 in., 57¢; 2 3/4 in., 57¢; 3 in., 57¢; 3 1/4 in., 57¢; 3 3/4 in., 57¢; 4 in., 57¢; 4 1/4 in., 57¢; 4 3/4 in., 57¢; 5 in., 57¢; 5 1/4 in., 57¢; 5 3/4 in., 57¢; 6 in., 57¢; 6 1/4 in., 57¢; 6 3/4 in., 57¢; 7 in., 57¢; 7 1/4 in., 57¢; 7 3/4 in., 57¢; 8 in., 57¢; 8 1/4 in., 57¢; 8 3/4 in., 57¢; 9 in., 57¢; 9 1/4 in., 57¢; 9 3/4 in., 57¢; 10 in., 57¢; 10 1/4 in., 57¢; 10 3/4 in., 57¢; 11 in., 57¢; 11 1/4 in., 57¢; 11 3/4 in., 57¢; 12 in., 57¢; 12 1/4 in., 57¢; 12 3/4 in., 57¢; 13 in., 57¢; 13 1/4 in., 57¢; 13 3/4 in., 57¢; 14 in., 57¢; 14 1/4 in., 57¢; 14 3/4 in., 57¢; 15 in., 57¢; 15 1/4 in., 57¢; 15 3/4 in., 57¢; 16 in., 57¢; 16 1/4 in., 57¢; 16 3/4 in., 57¢; 17 in., 57¢; 17 1/4 in., 57¢; 17 3/4 in., 57¢; 18 in., 57¢; 18 1/4 in., 57¢; 18 3/4 in., 57¢; 19 in., 57¢; 19 1/4 in., 57¢; 19 3/4 in., 57¢; 20 in., 57¢; 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Winter's Stranglehold Doesn't Relax

Snow and cold continues, dropping or halting scrap shipments . . . Pittsburgh mills avert shutdown by borrowing . . . New allocation orders go out but little is presently available.

The thermometer registered a consistent cold and snow storms had already done their damage or were on the way. Winter continued to impede and in some cases halt the scrap flow. For some mills the desperation point had been passed—in the wrong direction—and only emergency cooperation within the industry forestalled openhearth shutdowns.

December was a traditionally poor scrap month. But somehow the trade figured to squeak through. Then the weather took things in hand and stockpiles began vanishing bit by bit. Some areas still considered themselves "safe" but only if scrap sources and transportation start thawing out.

A few mills in the Pittsburgh district had over-extended their stockpile position when the big squall started. Somehow they stalled off shutdown of openhearth by living on borrowed scrap. Over 10,000 tons were loaned to the needy on the basis that it would be returned early in 1952. It was an instance of industry selflessness and perhaps the Christmas spirit—for scrap may be just as hard to get in January.

Some scrap people are saying consumers may just as well forget about rural collections until spring. Operators in storm-struck areas are having monumental difficulty in keeping their yards working. Transportation, both rail and road, is tricky, further curtailing the flow.

In some districts allocations from National Production Authority were increased to meet inventory deficits but in many cases this was wishful thinking. There was little money in the bank to cover the emergency checks that NPA was writing against future supplies.

The shortage is growing more

intense by the hour. Unless there is some break in the inclement weather, serious trouble will hit.

Pittsburgh—Some mills are borrowing scrap from more fortunate competitors in a desperate effort to maintain production. At least 10,000 tons have changed hands in this area on this basis. Under the arrangement, borrowing mills have promised to return the scrap early next year. It is hoped that (if there is any kind of a break in the weather so that material can move readily) it will be possible to return the scrap in the first quarter of 1952. At the moment there is no sign of an easing in the situation.

Chicago—Scrap shipments to the mills were hurt by snow storms which blanketed the Midwest last week. No mills were in immediate difficulty as a result of the storms although receipts fell off heavily for a few days. Most harm came from lack of scrap preparation because of absenteeism at some yards and an inability to work in inclement weather. Scrap from rural areas took a decided drop.

Philadelphia — Several freezing rains in the district glazed all roads and equipment with ice, cutting truck shipments and yard activity to the bone last week. Depending on their stockpiles, some mills would not accept shipments from Saturday through Tuesday, while some refused shipments on Christmas Day only. Cast iron borings have become an extremely tight commodity here.

New York—Grey skies that forecast snow worried scrap yard operators. The holiday spirit also was expected to take its toll off the working force. Allocations are not easily filled nowadays and this presages further trouble for the system. You can write tickets easily but they're hard to cash if there is no money in the bank. Some in the trade here were heartened at the lifting of some restrictions on scrap use by Amdt. 6 to CPR 5.

Detroit—Thus far a shortage of scrap has not resulted in any loss of steel production in this area. Inventories, generally speaking, are believed to be in better shape than in some other industrial areas. However, with the sharp curtailment of auto production and the extremely heavy snowfall of the past week, Storm warnings are being readied for Detroit scrap, too.

Cleveland—Snow and freezing rain have raised havoc with the mills in this area. Scrap yards have been unable to process scrap other than baling a few carloads of material that had been already prepared. Shipments are down considerably, if not stopped out of some yards. Blast furnace inventories are sufficient to last several weeks. Openhearth scrap inventories run 5 to 10 days.

St. Louis—Collection of scrap iron for this area has been stopped dead by sleet, snow, and cold. Processing of the few cars that managed to straggle in also was halted. Consumers are in desperate need of metallics. Allocations have been increased but supply cannot match them. A large foundry sank to 2-days supply.

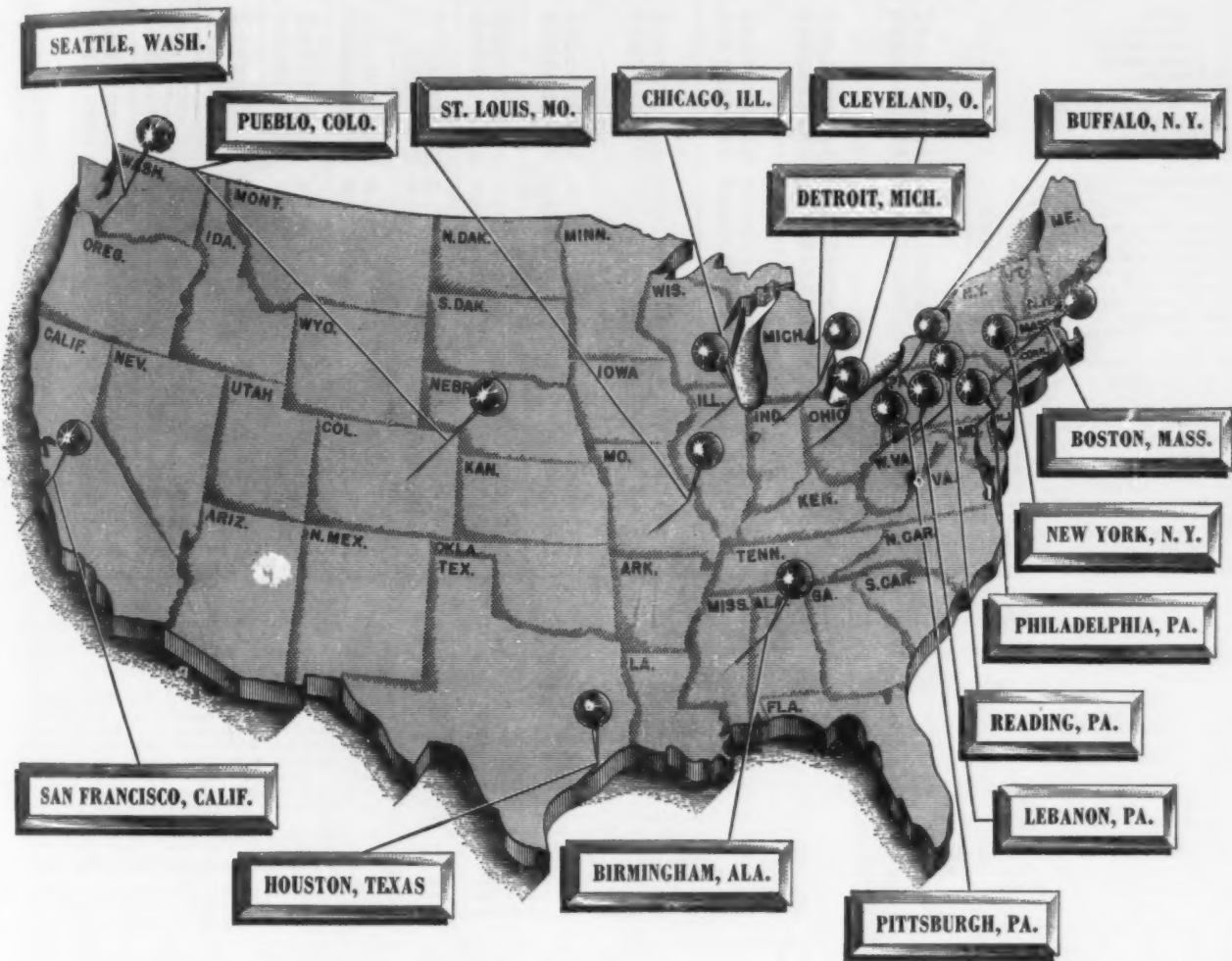
Birmingham—The cast scrap market in the Birmingham district is the easiest in several months, with practically no one buying. The heavy melting situation is just the opposite: everyone trying to buy, but little for sale. Most of the brokers' and dealers' buyers in Birmingham are home for the Christmas holidays and little trading is being done.

Cincinnati — Shipments from the South to Newport Steel are near normal level but small shipments from local yards have fallen off. Movement by truck of industrial scrap to the Middletown area has been slowed down by poor traffic conditions. Most Dayton scrap yards are virtually shut down because of inability to process or deliver scrap. Scrap from these yards goes to Middletown and some eastern furnaces.

Boston—The lack of openhearth scrap is being felt more and more here as supplies dwindle. Other items are slightly more abundant. Dealers say they expect more allocation.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

December 27, 1951

Scrap Prices

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

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GRADES	OPS No.	Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Cornishhooken	Harrisburg	Phoenixville	Sparrows Pt.	Beulah, Ky.	Kokomo, Ind.	Pertmouth, O.	St. Louis	Dayrell	Dueth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Portland, Ore.	San Francisco	Seattle																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		\$0.99	.75	.63	.66	.75	.51	.75	.51	.51	.75	.78		.76	.63	.65	.26	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51				.78	.50	.43	.51	.33	.57	.66	.52	.66	.66																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
No. 1 bundles.....	1	\$44.00							\$44.00					\$43.00				\$42.50							\$42.00			\$41.00	\$41.15	\$40.00	\$39.80	\$39.50	\$38.00	\$37.00	\$36.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
No. 1 busheling.....	2	44.00							44.00					43.00				42.50							42.00			41.00	41.15	40.00	39.80	39.50	38.00	37.00	36.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
No. 1 heavy melting.....	3	43.00							43.00					42.00				41.50							41.00			40.00	40.15	39.00	38.50	38.00	37.00	36.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
No. 2 heavy melting.....	4	43.00							43.00					42.00				41.50							41.00			40.00	40.15	39.00	38.50	38.00	37.00	36.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
No. 2 bundles.....	5	43.00							43.00					42.00				41.50							41.00			40.00	40.15	39.00	38.50	38.00	37.00	36.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Machine shop turnings.....	6	34.00							34.00					33.00				32.50							32.00			31.00	31.15	30.00	29.80	29.00	28.00	27.00	26.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Mixed borings and turnings.....	7	38.00							38.00					37.00				36.50							36.00			35.00	35.15	34.00	33.80	33.00	32.00	31.00	30.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Shovelling turnings.....	8	38.00							38.00					37.00				36.50							36.00			35.00	35.15	34.00	33.80	33.00	32.00	31.00	30.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Cast iron borings.....	10	38.00							38.00					37.00				36.50							36.00			35.00	35.15	34.00	33.80	33.00	32.00	31.00	30.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
No. 1 chemical borings.....	26	41.00							41.00					40.00				39.50							39.00			38.00	38.15	37.00	36.80	36.00	35.00	34.00	33.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Forge crops.....	11	51.50							51.50					50.50				50.00							49.50			48.50	48.65	47.50	47.00	46.50	45.50	44.50	43.50	42.50	41.50	40.50	39.50	38.50	37.50	36.50	35.50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Bar crops and plate.....	12	49.00							49.00					48.00				47.50							47.00			46.00	46.15	45.00	44.50	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Punchings and plate.....	14	46.50							46.50					45.50				45.00							44.50			43.50	43.65	42.50	42.00	41.50	40.50	39.50	38.50	37.50	36.50	35.50	34.50	33.50	32.50	31.50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Electric furnace bundles.....	15	46.00							46.00					45.00				44.50							44.00			43.00	43.15	42.00	41.50	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Cut struct., plate, 3 ft and less.....	16	47.00							47.00					46.00				45.50							45.00			44.00	44.15	43.00	42.50	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Cut struct., plate, 2 ft and less.....	17	49.00							49.00					48.00				47.50							47.00			46.00	46.15	45.00	44.50	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Cut struct., plate, 1 ft and less.....	18	50.00							50.00					49.00				48.50							48.00			47.00	47.15	46.00	45.50	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Foundry steel, 2 ft and less.....	20	44.00							44.00					43.00				42.50							42.00			41.00	41.15	40.00	39.50	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Foundry steel, 1 ft and less.....	21	46.00							46.00					45.00				44.50							44.00			43.00	43.15	42.00	41.50	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Heavy trimmings.....	24	43.00							43.00					42.00				41.50							41.00			40.00	40.15	39.00	38.50	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00	25.00	24.00	23.00	22.00	21.00	20.00	19.00	18.00	17.00	16.00	15.00	14.00	13.00	12.00	11.00	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	.50	.25	.12	.06	.03	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast.....	1	\$49.00
Charging box cast.....	2	47.00
Heavy breakable cast.....	3	45.00
Cast iron brake shoes.....	5	41.00
Stove plate.....	6	46.00
Clean auto cast.....	7	52.00
Unstripped motor blocks.....	8	43.00
Cast iron car wheels.....	9	47.00
Malleable.....	10	55.00
Drop broken mach'y cast.....	11	52.00

Ceiling price of clean cast iron foundry runoff or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall. Cincinnati: Newport. St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland. Claymont: Chester. Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap) —for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is \$1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, \$1.50, and New England ports, \$1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is \$36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap) — Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by

someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C and amend. 4, CPR 5.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Under Amend. 5 to CPR 5 ceiling prices are established for certain unprepared grades. Unprepared steel scrap for compression into No. 1 bundles calls for a \$6 differential (or deduction) from the base (No. 1 bundles). Unprepared steel scrap for No. 2 bundles, \$9 from base. Unprepared steel scrap other than material suitable for hydraulic compression, \$8 from base. Sec. 7 (a) (2) (Railroad grades) is amended to include: Unprepared steel scrap other than material suitable for hydraulic compression, \$8 from base.

COMMISSIONS—Brokers are permitted a maximum of \$1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel: \$1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 6.25 pct. Molybdenum: \$2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, \$3 for content over 0.65 pct. Manganese: \$4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., \$14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. Silicon: electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. Chromium: \$1 may be added if scrap conforms to SAE 52100 analysis.

Multiple Alloys: If scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rolling rails, cupola cast, billet, bloom, and forge crops,

Nos. 1 and 2 chemical borings. Ceiling price on billet, bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer.

See Amend. 5 to CPR for setting of single price on No. 1 Heavy, No. 2, and No. 1 bundles. No. 1 bundles are made prime grade from which to add or subtract differentials. Amendment also puts dealer to dealer sales under ceilings, permitting a \$1 resale margin, and trucking charges may be added only on shipments of prepared scrap.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

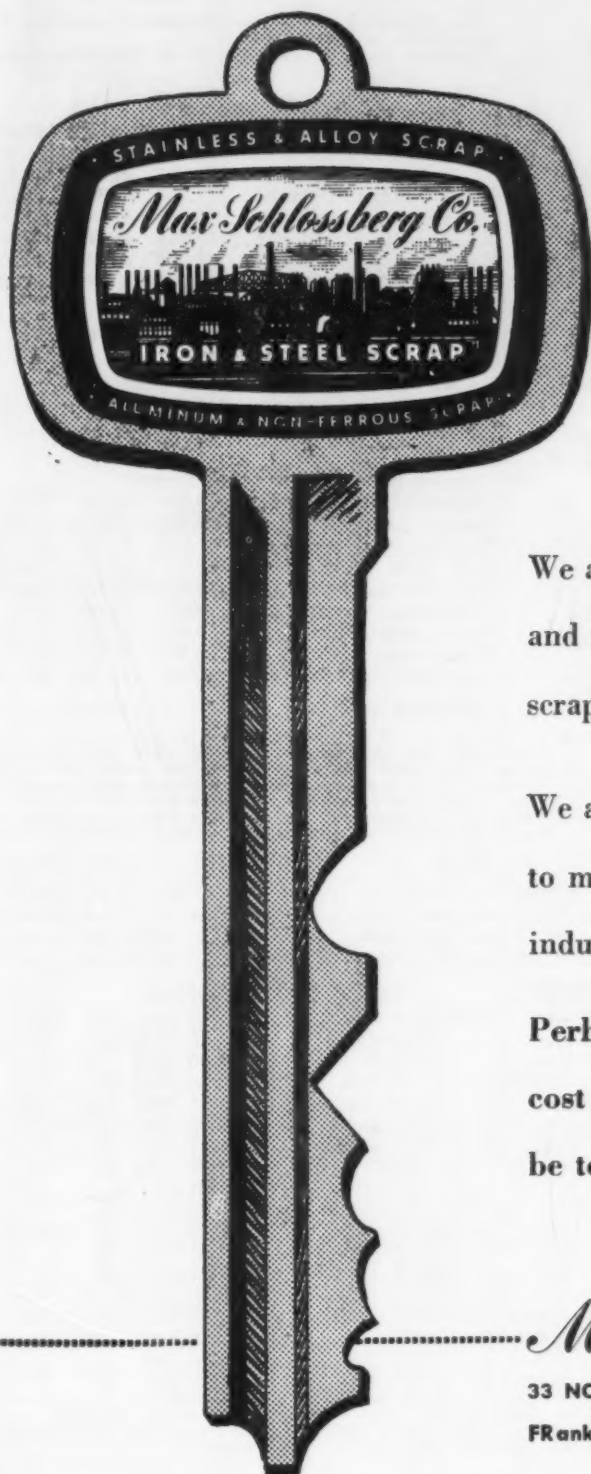
No. 1 heavy; No. 2 heavy; No. 1RR heavy; No. 2 RR heavy; No. 1 bushelling; No. 2 bundles; electric furnace bundles.....	\$5.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap.....	6.00
Crushing machine shop turnings.....	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 8 ft and under, foundry steel, 2 ft and under, wrought iron.....	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less.....	11.00
Structural and plate scrap, 1 ft and less.....	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames.....	4.00
Rails, 2 ft & less.....	5.00
Rails, 18 in. & less.....	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)	
Hvy. melting steel.....	\$35.00
No. 1 bundles.....	35.00
No. 2 bundles.....	34.50
Mechanical bundles.....	33.00
Mixed, steel scrap.....	31.00
Rails, remelting.....	35.00
Rails, rerolling.....	38.00
Bushellings.....	30.00
Bushellings, prepared new factory.....	32.00
Bushellings, unprepared new factory.....	28.00
Short steel turnings.....	32.00
Mixed borings, turnings.....	32.00
Cast scrap.....	55.00

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(cents per pound)	1951	1951	1951	1950
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.50

Fin and Ternplate:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(dollars per base box)				
Tinplate (1.50 lb.) cokes.	\$8.70	\$8.70	\$8.70	\$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35

Bars and Shapes:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50

Wire	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(cents per pound)				
Bright wire	4.85	4.85	4.85	4.85

Rails:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(dollars per 100 lb)				
Heavy rails	\$3.60	\$3.60	\$3.60	\$3.60
Light rails	4.00	4.00	4.00	4.00

Semifinished Steel:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(dollars per net ton)				
Rerolling billets	\$56.00	\$56.00	\$56.00	\$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00

Wire Rod and Skelp:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(per gross ton)				
No. 2 foundry, del'd Phila.	\$57.97	\$57.97	\$57.97	\$57.77
No. 2, Valley furnace....	52.50	52.50	52.50	52.50
No. 2, Southern Cin'ti... ..	55.58	55.58	55.58	55.58
No. 2, Birmingham.....	48.88	48.88	48.88	48.88
No. 2, foundry, Chicago†	52.50	52.50	52.50	52.50
Basic del'd Philadelphia.	57.09	57.09	57.09	56.92
Basic, Valley furnace....	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese†	186.25	186.25	186.25	181.20

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(per gross ton)				
No. 1 steel, Pittsburgh... ..	\$43.00*	\$43.00*	\$43.00*	\$46.13
No. 1 steel, Phila. area... ..	41.50*	41.50*	41.50*	44.50
No. 1 steel, Chicago.....	41.50*	41.50*	41.50*	44.75
No. 1 bundles, Detroit... ..	41.15*	41.15*	41.15*	40.25
Low phos. Young'n.....	46.50*	46.50*	46.50*	48.63
No. 1 cast, Pittsburgh... ..	49.00†	49.00†	49.00†	67.75
No. 1 cast, Philadelphia... ..	49.00†	49.00†	49.00†	62.50
No. 1 cast, Chicago.....	49.00†	49.00†	49.00†	65.00

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(per net ton at oven)				
Furnace coke, prompt... ..	\$14.75	\$14.75	\$14.75	\$14.25
Foundry coke, prompt... ..	17.75	17.75	17.75	17.25

Nonferrous Metals:	Dec. 25, 1951	Dec. 18, 1951	Nov. 27, 1951	Dec. 26, 1950
(cents per pound to large buyers)				
Copper, electro, Conn....	24.50	24.50	24.50	24.50
Copper, Lake, Conn.....	24.625	24.625	24.625	24.625
Tin, Straits, New York... ..	\$1.03†	\$1.03	\$1.03	\$1.50
Zinc, East St. Louis....	19.50	19.50	19.50	17.50
Lead, St. Louis.....	18.80	18.80	18.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	53.55
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex... ..	50.00	50.00	50.00	32.00

†Tentative.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1940 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

Composite Prices

Finished Steel Base Price

Dec. 25, 1951.....	4.131¢ per lb.....
One week ago.....	4.131¢ per lb.....
One month ago.....	4.131¢ per lb.....
One year ago.....	4.131¢ per lb.....

	High	Low
1951....	4.131¢ Jan. 2	4.131¢ Jan. 2
1950....	4.131¢ Dec. 1	3.837¢ Jan. 3
1949....	3.837¢ Dec. 27	3.3705¢ May 3
1948....	3.721¢ July 27	3.193¢ Jan. 1
1947....	3.193¢ July 29	2.848¢ Jan. 1
1946....	2.848¢ Dec. 31	2.464¢ Jan. 1
1945....	2.464¢ May 29	2.396¢ Jan. 1
1944....	2.396¢	2.396¢
1943....	2.396¢	2.396¢
1942....	2.396¢	2.396¢
1941....	2.396¢	2.396¢
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939....	2.35367¢ Jan. 3	2.26689¢ May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936....	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1932....	1.89196¢ July 5	1.83910¢ Mar. 1
1929....	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Pig Iron

.....	\$52.72 per gross ton....
.....	52.72 per gross ton....
.....	52.72 per gross ton....
.....	52.69 per gross ton....

High			Low		
\$52.72	Oct.	9	\$52.69	Jan.	2
52.69	Dec.	12	45.88	Jan.	3
46.87	Jan.	18	45.88	Sept.	6
46.91	Oct.	12	39.58	Jan.	6
37.98	Dec.	30	30.14	Jan.	7
30.14	Dec.	10	25.37	Jan.	1
25.37	Oct.	23	23.61	Jan.	2
\$23.61			\$23.61		
23.61			23.61		
23.61			23.61		
\$23.61	Mar.	20	\$23.45	Jan.	2
23.45	Dec.	23	22.61	Jan.	2
22.61	Sept.	19	20.61	Sept.	12
23.25	June	21	19.61	July	6
32.25	Mar.	9	20.25	Feb.	16
19.74	Nov.	24	18.73	Aug.	11
14.81	Jan.	5	13.56	Dec.	6
18.71	May	14	18.21	Dec.	17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel

.....	\$42.00 per gross ton.....
.....	42.00 per gross ton.....
.....	42.00 per gross ton.....
.....	45.13 per gross ton.....

High			Low		
\$47.75	Jan.	30	\$42.00	Oct.	23
45.13	Dec.	19	26.25	Jan.	3
43.00	Jan.	4	19.33	June	25
43.16	July	27	39.75	Mar.	9
42.58	Oct.	28	29.50	May	20
31.17	Dec.	24	19.17	Jan.	1
19.17	Jan.	2	18.92	May	22
19.17	Jan.	11	15.76	Oct.	24
\$19.17			\$19.17		
19.17			19.17		
\$22.00	Jan.	7	\$19.17	Apr.	10
21.83	Dec.	30	16.04	Apr.	9
22.50	Oct.	3	14.08	May	16
15.00	Nov.	22	11.00	June	7
21.92	Mar.	30	12.67	June	9
17.75	Dec.	21	12.67	June	8
8.50	Jan.	12	6.43	July	5
17.58	Jan.	29	14.08	Dec.	8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Can Straight-Chrome Stainless

Stainless

help you
beat the
nickel
shortage?

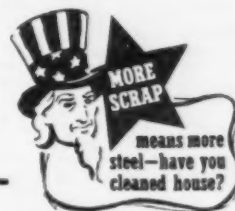
Courtesy —
Mercury Conveyor, Inc.

If you're seeking to beat the nickel shortage — this all-stainless conveyor will carry a valuable suggestion for you. The manufacturer, like many others serving the food industry, had long used nickel-bearing stainless steel to make a completely sanitary unit.

Recent nickel controls, however, greatly curtailed production — and prompted a decision to utilize substitute materials. But there were shop and fabricating practices to consider — in addition to the appearance, sanitation and service life of the final product.

Frasse Technical Service was called in for advice. After study, Frasse engineers recommended Type 430, a straight-chrome stainless that not only met all requirements — but was freely available from Frasse warehouse stock.

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64-1

Please send me a complimentary copy of your new Engineering Memorandum on Straight-Chrome Stainless Steel.

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Address _____

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page. Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

THE IRON AGE, December 27, 1951

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana	
			F=\$79.00 ¹⁹	INGOTS Carbon forging, net ton
	\$82.00 ²³		F=\$80.00 ¹⁹	Alloy, net ton
		\$86.00 ¹¹	F=\$75.00 ¹⁹	BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	\$74.00 ²³	\$86.00 ¹¹	F=\$85.00 ¹⁹ SF, LS, S=\$85.00 ²²	Carbon forging billets, net ton
	\$78.00 ²³		F=\$80.00 ¹⁹ LA=\$90.00 ²²	Alloy net ton
4.56 ²³	4.10 ¹¹		SF=4.90 ²³ , F=4.90 ¹⁹ LA=4.90 ²⁴ , 4.62	PIPE SKELP
	3.60 ¹¹		SF, LA=4.30 ²⁴ F=4.55 ¹⁹	WIRE RODS
	4.35 ¹¹		SF=5.30 ²⁴ F=5.30 ¹⁹	SHEETS Hot-rolled (18 ga. & hvr.)
	4.80 ¹¹		SF, LA=5.55 ²⁴	Cold-rolled
			Alton=4.40 ²³ Worcester=4.40 ²³ Minnequa=4.35 ¹⁴ Portsmouth=4.30 ²⁰	Galvanized (10 gage)
			Niles=5.28 ²⁴ , Geneva=3.70 ¹⁸ Ashland=3.60 ²⁷	Enamelling (12 gage)
			Ashland=4.88 ²⁷ Kokomo=5.20 ²⁹	Long ternes (10 gage)
			Ashland=4.65 ²⁷	Hi str. low alloy, h.r.
	5.40 ¹¹		F=6.35 ¹⁹	Hi str. low alloy, c.r.
			F=7.50 ¹⁹	Hi str. low alloy, galv.
4.10 ²³	4.90 ²³	3.60 ¹¹	SF, LA=4.25 ²⁴ , 4.62 F=4.75 ¹⁹ , S=4.50 ²²	STRIP Hot-rolled
			F=6.30 ¹⁹ LA=6.40 ²⁷	Cold-rolled
			Alton=3.95 ²² Atlanta=4.05 ²³ Minnequa=4.55 ¹⁴ Ashland=3.50 ²⁷	Hi str. low alloy, h.r.
		5.30 ¹¹	F=6.20 ¹⁹ SF, LA=6.05 ²² S=6.30 ²²	Hi str. low alloy, c.r.
			F=6.95 ¹⁹	TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
			SF=9.20 ²⁴	Electrolytic 0.25, 0.50, 0.75 lb box
4.30 ²³	4.10 ²³	3.70 ¹¹	SF, LA=4.40 ²⁴	BLACKPLATE, 29 gage Hollowware enamelling
4.30 ²³	4.10 ²³	3.70 ¹¹	SF, S=4.45 ²² F=4.40 ¹⁹ , LA=4.40 ²²	BARS Carbon steel
4.90 ²³	4.70 ²³		LA=6.00 ²⁴	Reinforcing
			Atlanta=4.25 ²³ Minnequa=4.50 ¹⁴	Cold-finished
			Newark=5.00 ²⁹ Putnam=5.10 ²⁹ Hartford=5.10 ²⁴	Alloy, hot-rolled
			LA=5.35 ²² F=5.35 ¹⁹	Alloy, cold-drawn
			Newark=5.75 ²⁹ Worcester=5.75 ²² Hartford=5.95 ²⁴	Hi str. low alloy, h.r.
		5.55 ¹¹	F=6.60 ¹⁹ , SF, S=6.30 ²² LA=6.25 ²²	PLATE Carbon steel
	4.10 ²³	3.70 ¹¹	F=4.30 ¹⁹ S=4.60 ²²	Floor plates
			F=5.70 ¹⁹	Alloy
			Coatesville=5.25 ²³ Claymont=4.85 ²⁹	Hi str. low alloy
		5.65 ¹¹	F=6.25 ¹⁹ S=6.55 ²²	SHAPES, Structural
4.25 ²³	4.05 ²³	3.60 ¹¹ 3.85 ¹¹	SF=4.20 ²² , F=4.25 ¹⁹ LA=4.25 ²⁴ , 4.62 S=4.30 ²²	Si str. low alloy
		5.50 ¹¹	S=6.10 ²³ , F=6.10 ¹⁹ SF=6.00 ²² , LA=6.05 ²³	MANUFACTURERS' WIRE Bright
5.45 ²³	5.25 ²³	4.85 ¹¹	SF, LA=5.80 ²⁴	

Key to Steel Producers

- U. S. Steel Co., Pittsburgh
- American Steel & Wire Co., Cleveland
- Bethlehem Steel Co., Bethlehem
- Republic Steel Corp., Cleveland
- Jones & Laughlin Steel Corp., Pittsburgh
- Youngstown Sheet & Tube Co., Youngstown
- Armco Steel Corp., Middletown, Ohio
- Inland Steel Co., Chicago
- Wairton Steel Co., Wairton, W. Va.
- National Tube Co., Pittsburgh
- Tennessee Coal, Iron & R. R. Co., Birmingham
- Great Lakes Steel Corp., Detroit
- Sharon Steel Corp., Sharon, Pa.
- Colorado Fuel & Iron Corp., Denver
- Wheeling Steel Corp., Wheeling, W. Va.
- Geneva Steel Co., Salt Lake City
- Crucible Steel Co. of America, New York
- Pittsburgh Steel Co., Pittsburgh
- Kaiser Steel Corp., Oakland, Calif.
- Portsmouth Div., Detroit Steel Corp., Detroit
- Lukens Steel Co., Coatesville, Pa.
- Granite City Steel Co., Granite City, Ill.
- Wisconsin Steel Co., South Chicago, Ill.
- Columbia Steel Co., San Francisco
- Copperweld Steel Co., Glassport, Pa.
- Alan Wood Steel Co., Conshohocken, Pa.
- Calstrip Steel Corp., Los Angeles
- Allegheny Ludlum Steel Corp., Pittsburgh
- Claymont Steel Corp., Claymont, Del.
- Continental Steel Corp., Kokomo, Ind.
- Rotary Electric Steel Co., Detroit
- Laclede Steel Co., Alton, Ill.
- Northwestern Steel & Wire Co., Sterling, Ill.
- Keystone Steel & Wire Co., Peoria, Ill.
- Central Iron & Steel Co., Harrisburg, Pa.
- Carpenter Steel Co., Reading, Pa.
- Eastern Stainless Steel Corp., Baltimore
- Washington Steel Corp., Washington, Pa.
- Jessop Steel Co., Washington, Pa.
- Blair Strip Steel Co., New Castle, Pa.
- Superior Steel Corp., Carnegie, Pa.
- Timken Steel & Tube Div., Canton, Ohio
- Babcock & Wilcox Tube Co., Beaver Falls, Pa.
- Reeves Steel & Mfg. Co., Dover, Ohio
- John A. Roebling's Sons Co., Trenton, N. J.
- Simonds Saw & Steel Co., Fitchburg, Mass.
- McLouth Steel Corp., Detroit
- Cold Metal Products Co., Youngstown
- Thomas Steel Co., Warren, Ohio
- Wilson Steel & Wire Co., Chicago
- Sweet's Steel Co., Williamsport, Pa.
- Superior Drawn Steel Co., Monaca, Pa.
- Tremont Nail Co., Wareham, Mass.
- Firth Sterling St. & Carbide, McKeessport
- Ingersoll Steel Div., Chicago
- Phoenix Iron & Steel Co., Phoenixville, Pa.
- Fitzsimons Steel Co., Youngstown
- Stanley Works, New Britain, Conn.
- Universal-Cyclops Steel Corp., Bridgeville, Pa.
- American Cladmetals Co., Carnegie, Pa.
- Cuyahoga Steel & Wire Co., Cleveland
- Bethlehem Pacific Coast Steel, San Fran.
- Follansbee Steel Corp., Pittsburgh
- Niles Rolling Mill Co., Niles, Ohio
- Atlantic Steel Co., Atlanta
- Acme Steel Co., Chicago
- Joslyn Mfg. & Supply Co., Chicago
- Detroit Steel Corp., Detroit
- Wycoff Steel Co., Pittsburgh
- Bliss & Laughlin, Inc., Harvey, Ill.
- Columbia Steel & Shaffing Co., Pittsburgh
- Cumberland Steel Co., Cumberland, Md.
- La Salle Steel Co., Chicago
- Monarch Steel Co., Inc., Hammond, Ind.
- Empire Steel Co., Mansfield, Ohio
- Mahoning Valley Steel Co., Niles, Ohio
- Oliver Iron & Steel Co., Pittsburgh
- Pittsburgh Screw & Bolt Co., Pittsburgh
- Standard Forging Corp., Chicago
- Driver Harris Co., Harrison, N. J.
- Detroit Tube & Steel Div., Detroit
- Reliance Div., Eaton Mfg. Co., Massillon, Ohio
- Sheffield Steel Corp., Kansas City
- Plymouth Steel Co., Detroit
- Wickwire Spencer Steel, Buffalo
- Angell Nail and Chaplet, Cleveland
- Mid-States Steel & Wire, Crawfordsville, Ind.
- National Supply, Pittsburgh, Pa.
- Wheatland Tube Co., Wheatland, Pa.
- Mercer Tube & Mfg. Co., Sharon, Pa.
- Woodward Iron Co., Woodward, Ala.
- Glass-Steel Steel & Iron Co., Birmingham
- Hanna Furnace Corp., Detroit
- Interlake Iron Corp., Cleveland
- Lone Star Steel Co., Dallas
- Mystic Iron Works, Everett, Mass.
- Jackson Iron & Steel Co., Jackson, O.
- Globe Iron Co., Jackson, O.
- Pittsburgh Coke & Chemical Co., Pittsburgh
- Shenango Furnace Co., Pittsburgh
- Tennessee Products & Chem. Corp., Nashville
- Koppers Co., Inc., Granite City, Ill.
- Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
- Wallingford Steel Co., Wallingford, Conn.
- Tonawanda Iron Div., N. Tonawanda, N. Y.
- Pilgrim Drawn Steel Div., Automotive Materials Corp., Plymouth, Mich.

¹ Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128-lb, deduct \$2.20 from 1.25-lb coke base box.

Steel Prices

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingot rolling.....	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rolling.....	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings.....	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging.....	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals.....	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates.....	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets.....	41.00	41.25	43.25	43.25	57.00	48.25	53.75	36.50	37.00	39.00
Strip hot-rolled.....	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled.....	34.00	36.75	40.25	38.75	50.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—Sheets: Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 4, 5¢); 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 4, 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13 (type 301 add 1/4¢); Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add 1/4¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

*ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 Series.

WASHINGTON STEEL—Slightly lower on 300 Series except where noted.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Base Col.	Base Col.	Base Col.	Base Col.	Base Col.	Base Col.	Base Col.	e/lb.	e/lb.
Alabama City-4	118	126	123	136	5.70	5.95			
Alliquippa, Pa.-5	118	132	136	140	5.70	6.15			
Atlanta-65	121	133	126	126	143	5.95	6.40		
Bartonsville-34	118	130	123	143	143	5.70	6.15		
Buffalo-85						4.85			
Cleveland-86	125					5.70	6.15		
Cleveland-2						5.70	6.15		
Crawfordsville-67		132				145	5.95	6.40	
Donora, Pa.-2	118	130	123	140	140	5.70	6.15		
Duluth-2	118	130	123	140	140	5.70	6.15		
Fairfield, Ala.-11	118	130	123	140	140	5.70	6.15		
Houston-83	126	138				148	6.10	6.55	
Johnstown, Pa.-3	118	130				140	5.70	6.15	
Joliet, Ill.-2	118	130	123	140	140	6.70	6.15		
Kokomo, Ind.-30	120	132	125	138	142	5.80	6.05		
Los Angeles-62						6.65			
Kansas City-83	130		135			152	6.30	6.75	
Minnequa-14	123	138	130	128	146	145	5.95	6.45	
Monessen-18	124	135				145	5.95	6.40	
Moline-III-4			136						
Pittsburg									
Cal.-24	137			147	156	160	6.65	6.80	
Portsmouth-20	128	137				147	147	6.10	6.80
Rankin, Pa.-2	118	130				140	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123		136	5.70	5.95	
S. San Fran.-14				147		160	6.65	7.10	
Sparrows, Pt.-3	120			125	142	142	5.80	6.25	
Sterling, Ill.-33	118	130				123	140	5.70	6.15
Struthers, Ohio-6							6.70	6.15	
Torrance, Cal.-24	138						6.65		
Worcester-2	124						6.00	6.45	
Williamsport, Pa.-51			150						

Cut Nails, carloads, base, \$7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va. (18), \$7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

Per Net Ton
6 to 24-in., del'd Chicago \$105.30 to \$108.80
6 to 24-in., del'd N.Y.... 108.50 to 109.50
6 to 24-in., Birmingham 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less \$123.00 to \$130.00
Class "A" and gas pipe, 5¢ extra; 4-in. pipe is \$5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS					
	1/2 in.	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.	2 1/2 in.	3 in.	3 1/2 in.	4 in.	4 1/2 in.	5 in.	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.
STANDARD T. & C.																		
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0				
Cleveland-4	36.0	14.0	38.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0				
Oakland-19	25.0	3.0	28.0	9.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0				
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5
Alton, Ill.-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0				
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0				
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5	34.5
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0				
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5				
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5
EXTRA STRONG, PLAIN ENDS																		
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0				
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0				
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0				
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0
Alton, Ill.-32	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0				
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0				
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0	36.5
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0				
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5				
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: 1/2 in., 3/4 in., and 1 in., 1 pt.; 1 1/4 in., 1 1/2 in., 2 in., 3/4 pt.; 2 1/2 in., 3 in., 1/2 pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, butt-weld and seamless, 1 pt. higher discount. Plain ends, butt-weld and seamless, 3 in. and under, 3 1/2 pts. higher discount. Butt-weld jobbers' discount, 5 pts. East St. Louis zinc price now 19.50¢.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Cleveland-3					9.35			
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.70	6.15	5.00		4.50	9.00
Gary-1	3.60	4.00						
Ind. Harbor-8	3.60		4.70	6.15	5.00		4.50	
Johnstown-3		4.00			5.00			
Joliet-1		4.00	4.70					
Kansas City-63				6.40				9.00
Lackawanna-3	3.60	4.00	4.70				4.50	
Lebanon-3				6.15		9.35		9.00
Minnequa-14	3.60	4.50	4.70				4.50	9.00
Pittsburgh-3						9.35		
Pittsburgh-77						9.35		9.00
Pittsburgh-78						9.35		9.00
Pittsburgh-8				6.15				
Pittsburgh-24				6.85			4.65	
Seattle-62							4.50	
Steelton-3	3.60		4.70					
Struthers-6				6.15				4.65
Torrance-24				6.15				
Youngstown-4								9.35
Cleveland-4								

BOILER TUBES \$ Per 100 ft. cut, 10 to 24 in

F.o.b. Mill	Size	Seamless	Elec. Weld
	OD-In.	B.W. Ga.	H.R. C.D. H.R. C.D.
Babcock & Wilcox	2	13	22.67 26.66 21.90 23.84
	2 1/2	12	30.48 35.84 29.57 34.74
	3	12	33.90 39.90 32.89 38.70
	3 1/2	11	42.37 49.89 41.10 48.30
	4	10	52.60 61.88 51.03 60.82
National Tube	2	13	21.62 26.48
	2 1/2	12	29.85 36.32
	3	12	34.00 41.64
	3 1/2	11	40.34 49.41
	4	10	51.21 62.72
Pittsburgh Steel	2	13	27.00
	2 1/2	12	30.49 37.15
	3	12	34.95 42.89
	3 1/2	11	41.48 50.5

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. * (Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢.)

City	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (16 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold- Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore.....	5.60	6.84	7.49 ² 8.07	6.04		5.80	6.14	6.04	6.84 6.88	10.24	10.54	11.89	12.19
Birmingham*.....	5.60	6.40	6.75	5.85		5.95	5.70	5.55					
Bocon.....	6.20	7.00	7.74 7.25	8.15	8.50 ⁴	6.48 6.78	6.20	6.05	6.79 6.84	10.25	10.55	11.90 12.00	12.20 12.30
Buffalo.....	5.60	6.40	7.74 8.09	5.85		6.03	5.80	5.60	6.40 6.45	10.15 10.85	10.45	11.80	11.95 12.10
Chicago.....	5.60	6.40	7.75	5.55		5.60	5.70	5.55	6.30 6.45	9.80	10.10	11.45	11.75
Cincinnati*.....	5.67	6.44	7.39	.80		5.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland.....	5.60	6.40	8.10	5.99	6.90	5.92	5.02	5.57	6.40	9.91	10.21	11.56	11.86
Detroit.....	5.78	6.53	7.89	5.94		5.99	6.09	5.84	6.58	10.11	10.41	11.75	12.06
Houston.....	7.00	6.25				6.85	6.50	6.65	9.35	10.35	11.25		12.75
Indianapolis, Ind.*.....	6.00	6.80	8.15	5.95		6.20	6.10	5.95	6.80				
Kansas City.....	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles.....	6.35	7.90	8.85	6.40	9.45 ⁶	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*.....	6.33	7.09		6.33		6.43	6.33	6.00	7.10				
Milwaukee.....	6.38	7.18		6.38		6.02	6.48	6.33	7.32				
Milwaukee.....	5.74	6.54	7.89 6.59	5.69		5.94	5.84	5.69	6.44 6.54	9.94	10.24	11.59	11.89
New Orleans*.....	5.70	6.59		5.75	7.25	5.95	5.75	5.75	7.30				
New York*.....	5.67 5.97 6.50 ³	7.19 ³ 7.24 ¹	6.14 ²	6.29 6.69	8.63 ⁴	6.28 6.58 6.50 ³	6.10	6.12	6.99	10.05 10.15	10.35 10.45	11.70 11.80	12.10 12.20
Norfolk.....							6.00 ³	6.55 ³					
Philadelphia*.....	5.90	6.80	8.00	6.10		6.05	5.90	6.05	6.86	9.90	10.20		
Pittsburgh.....	5.60	6.40	7.75	5.65 5.95		5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland.....	6.60	8.95	8.50 9.10	7.30		6.80	6.85	6.90			12.15		
Salt Lake City.....	7.95		9.70 10.50 ²	6.70 8.75		8.05	6.75 8.30	7.95 8.65	9.00				
San Francisco*.....	6.85	8.05 ²	8.55 8.90 ²	6.80	9.95 ⁵	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20 13.50
Seattle.....	7.05	8.60	9.20	9.05		6.75	6.65	6.75	9.05				
St. Louis.....	5.80 5.85	6.65	8.00	5.80	8.00 ⁴ 8.28	6.13	6.03	5.80	6.55 6.65	10.05	10.35	11.70	12.00
St. Paul*.....	6.16	6.96	8.31	6.11		6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 8000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50			
Birmingham-4	48.38	48.88					
Birmingham-51	48.38	48.88					
Birmingham-92	48.38	48.88					
Buffalo-4	52.00	52.50	53.00				
Buffalo-93	52.00	52.50	53.00			53.75	
Chicago-94	52.00	52.50	52.50	53.00			
Cleveland-2	52.00	52.50	52.50	53.00	57.00		
Cleveland-4	52.00	52.50	52.50				
Davenport, Tex.-95	48.00	48.50	48.50				
Duluth-94	52.00	52.50	52.50	53.00			
Erie-94	52.00	52.50	52.50	53.00			
Ferritt, Mass.-95		57.00	57.50				
Fontana-19	55.00	58.50					
Geneva, Utah-10	52.00	52.50	52.50	53.00			
Granite City, Ill.-102	53.90	54.40	54.90				
Hubbard, Ohio-5	52.00	52.50	52.50				
Ironton, Utah-15	52.00	52.50					
Jackson, Ohio-97, 98						52.50	
Lyle, Tenn.-101							66.00
Monessen-18	54.00						
Neville Island-99	52.00	52.50	52.50	53.00			
Pittsburgh-1	52.00		52.50	53.00			
Sharpsville-100	52.00	52.50	52.50	53.00			
Stellton-3	54.00	54.50	55.00	55.50	60.00		
Swedeland-26	55.00	56.50	57.00	57.50			
Toledo-94	52.00	52.50	52.50	53.00			
Troy, N. Y.-4	54.00	54.50	55.00		60.00		
Youngstown-5	52.00	52.50	52.50	53.00			
Altanawanda, N. Y.-105	52.50	53.00	53.00				

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add \$1.50 per ton for each 0.50 pct iron over base, (6.01 to 6.50 pct) up to 17 pct, \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer iron on prices are \$1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5)	\$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	82.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	12.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	.....	\$94.60
Childs, Pa.	.....	99.00
Hays, Pa.	.....	100.10
Chicago District	.....	104.50
Western Utah and Calif.	.....	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	.....	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	.....	16.50
Silica cement, net ton, bulk, Hays, Pa.	.....	18.70
Silica cement, net ton, bulk, Ensley, Ala.	.....	17.60
Silica cement, net ton, bulk, Chicago District	.....	17.60
Silica cement, net ton, bulk, Utah and Calif.	.....	24.70

Chrome Brick

Chrome Brick	<i>Per Net Ton</i>
Standard chemically bonded, Balt., Chester	\$82.00

Magnesite Brick

Standard, Baltimore	\$104.00
Chemically bonded, Baltimore....	93.00

Grain Magnesite

Grain Magnesite	St. %-in. grains
Domestic, f.o.b. Baltimore, in bulk fines removed.....	\$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.80
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢....\$13.75

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$14.50 to \$15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$17.50 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$26.69
Chicago, f.o.b.	24.00
Detroit, f.o.b.	24.00
New England, del'd	24.50
Seaside, f.o.b.	22.75
Philadelphia, f.o.b.	22.79
Swedeland, Pa., f.o.b.	23.66
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.73
Cincinnati, del'd	25.06
St. Paul, f.o.b.	23.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)	Per gross ton
Old range, bessemer	\$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.20

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06- 1.35
Bridgeport, Conn.-50	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	5.35	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.85	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.65	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pot Off List	Less Case	C.
1/2 in. & smaller x 6 in. & shorter	15	28 1/2	
9/16 in. & 5/8 in. x 6 in. & shorter	18 1/2	30 1/2	
3/4 in. & larger x 6 in. & shorter	17 1/2	29 1/2	
All diam. longer than 6 in.	14	27 1/2	
Lag, all diam. x 6 in. & shorter	23	35	
Lag, all diam. longer than 6 in.	21	33	
Plow bolts	34		

Nuts, Hot Pressed, Cold Punched—Sq

	Pot Off List	Less Keg	Reg.	K.	Hvy.	K.
1/2 in. & smaller	15	28 1/2	15	28 1/2		
9/16 in. & 5/8 in.	12	25	6 1/2	21		
3/4 in. to 1 1/2 in.						
Inclusive	9	23	1	16 1/2		
1 1/2 in. & larger	7 1/2	22	1	16 1/2		

Nuts, Hot Pressed—Hexagon

1/2 in. & smaller	26	37	22	34
9/16 in. & 5/8 in.	16 1/2	29 1/2	6 1/2	21
3/4 in. to 1 1/2 in.				
Inclusive	12	25	2	17 1/2
1 1/2 in. & larger	8 1/2	23	2	17 1/2

Nuts, Cold Punched—Hexagon

1/2 in. & smaller	26	37	22	34
9/16 in. & 5/8 in.	23	35	17 1/2	30 1/2
3/4 in. to 1 1/2 in.				
Inclusive	19 1/2	31 1/2	12	25
1 1/2 in. & larger	12	25	6 1/2	21

Nuts, Semi-Finished—Hexagon

	Reg.	Hvy.
1/2 in. & smaller	35	45
9/16 in. & 5/8 in.	29 1/2	40 1/2
3/4 in. to 1 1/2 in.		
Inclusive	24	36
1 1/2 in. & larger	13	26
Light		
7/16 in. & smaller	35	45
1/2 in. thru 3/4 in.	28 1/2	39 1/2
3/4 in. to 1 1/2 in.		
Inclusive	26	37

Stove Bolts

	Pot Off List
Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	63*
*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.	
**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.	

Rivets

	Base per 100 lb.
1/2 in. & larger	Pot Off List \$7.85
7/16 in. & smaller	36
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.	

Cap and Set Screws

	Pot Off List
(In bulk)	
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 3/4 in. x 6 in., SAE 1020, bright	54
1/4 in. thru 1 in. up to & including 6 in.	43
3/4 in. thru 3/4 in. x 6 in. & shorter	46
high C double heat treat	46
1/4 in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b., plant threaded electrodes with nipples, unbored

Diam. in in.	Length in in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 14	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2 1/2	24, 30	23.15
2	24, 30	25.36
CARBON		
40	100, 110	3.03
35	65, 110	3.03
30	65, 84, 110	3.03
24	72 to 104	3.03
20	84, 90	3.03
17	60, 72	3.03
14	60, 72	3.57
10, 12	60	3.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b., mill	
Stainless-carbon	Plate Sheet
No. 304, 20 pct.	
Cotatesville, Pa. (21)...	\$29.5
Washgtn., Pa. (39)...	\$29.5
Claymont, Del. (29)...	\$28.00
Conshchocken, Pa. (26)...	\$27.50
New Castle, Ind. (55)...	\$25.50
Nickel-carbon	
10 pct Cotatesville (21)...	32.5
Inconel-carbon	
10 pct Cotatesville (21)...	40.5
Monel-carbon	
10 pct Cotatesville (21)...	33.5
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)...	77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)...	7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill	
W	Cr
18	4
18	4
18	4
1.5	4
6	4
High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢
Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.	

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.	
Swedish sponge iron c.l.f.	7.4¢ to 9.0¢
New York, ocean bags...	
Canadian sponge iron, del'd, In East	10.00¢
Domestic sponge iron, 98+%	
Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+%	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+%	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+%	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+%	83.0¢ to \$1.43
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 32.25¢
Copper, electrolytic, 13.75¢ plus metal value	
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quantity, del'd.	33.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	22.75
Nickel, unannealed	85.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	35.5¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	33.00¢
Stainless steel, 316	31.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	60.00
Zinc, 10 ton lots	33.0¢ to 30.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 60	Transf. 48
Beech-Bottom-15	7.25	8.50	9.30	9.85	10.40	11.10	
Brackenridge-28	7.25	8.50	9.30	9.85	10.40	11.10	
Follansbee-23	8.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	7.95	9.20					
Ind. Harbor-3	6.75	7.25					
Mansfield-75	7.25	7.75	9.00	9.85	10.40	11.10	
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads delivered. (65-72% Cr, 2% max. Si)	
0.06% C	30.50
0.10% C	30.00
0.15% C	29.75
2.00% C	
65-69% Cr, 4-9% C	23.00
62-66% Cr, 4-6% C, 6-9% Si	22.60

Foundry Ferrochrome

Contract prices, cents per lb of alloy	
Noncontract prices add 0.25¢ per lb.	
High carbon 8 mesh and down.	
62 to 66% Cr, 5 to 7% C, 7 to 10% Si	
Carloads, bulk	23.10
Carloads, packed	24.10
Ton lots, packed	27.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-73% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.	
--	--

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.10
0.50% max. C	1.10
9 to 11% C	1.00

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.)	
Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.	
Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 13.60¢ per lb contained Si	

Calcium-Silicon

Contract price per lb of alloy, dump delivered.	
30-33% Ca, 60-65% Si, 3.00% max. Fe	
Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si	
Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-43% Cr, 17-19% Si, 8-11% Mn.	
Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. SI 48 to 52%, TI 9 to 11%, Ca 5 to 7%.	
Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zn, 20% Fe, 1/2 in. x 12 mesh.	
Ton lots	17.50
Less ton lots	19.50

Ferroalloy Prices

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.
 F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O. \$185
 F.o.b. Johnstown, Pa. \$187
 F.o.b. Sheridan, Pa. \$185
 F.o.b. Etna, Clinton, Pa. \$188
 \$2.00 for each 1% above 82% Mn. penalty, \$2.15 for each 1% below 78%.
 Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
 Carload, bulk 10.95
 Ton lots 12.55

Spiegeleisen

Contract prices gross ton; lump, f.o.b.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Palmerton, Pa. \$74.00 \$75.00
 Pgh. or Chicago 75.00 76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
 96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
 Carload, packed 34.75
 Ton lots 36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
 Carloads 28
 Ton lots 30
 Less ton lots 32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn. 19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
 Cast Turnings Distilled
 Ton lots \$2.05 \$2.95 \$3.75
 Less ton lots... 2.40 3.30 4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
 Carload bulk 9.90
 Ton lots 11.55
 Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
 Ton lots 12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$90.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
 96% Si, 2% Fe 21.70
 97% Si, 1% Fe 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.
 Carload, bulk 6.95
 Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.
 25% Si 20.00 75% Si 14.30
 50% Si 12.40 85% Si 15.55
 90-95% Si 17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.
 Carloads Ton Less
 0.7% max. C, 0.06% P, 90% Mn 26.25 28.10 29.30
 0.07% max. C 25.75 27.60 28.80
 0.15% max. C 25.25 27.10 28.30
 0.30% max. C 24.75 26.60 27.80
 0.50% max. C 24.25 26.10 27.30
 0.75% max. C 23.75 25.60 26.80
 7.00% max. Si 21.25 23.10 24.30

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
 Carload 9.90¢
 Ton lots 11.30¢

Calcium molybdate, 46.3-46.6%, f.o.b. Langeloth, Pa., per pound contained Mo. \$1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
 Ton lots \$4.90
 Less ton lots 4.95

Ferro - Tantalum - columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta \$3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. \$1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton \$65.00
 10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti \$1.35



"She's a friend of the Navy inspector."

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti \$1.80
 Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton \$177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered \$5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
 Openhearth \$3.00-\$3.10
 Crucible 2.10-2.20
 High speed steel (Primos) 3.20-3.25

Molybdenic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. \$1.14
 bags, f.o.b. Washington, Pa., Langeloth, Pa. \$1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
 Carload, bulk lump 14.50¢
 Ton lots, bulk lump 16.75¢
 Less ton lots, lump 16.25¢

Vanadium pentoxide, 56-59% V₂O₅, contract basis, per pound contained V₂O₅ \$1.23

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
 Ton lots 21.00¢

Zirconium, 12-15% contract basis, lump, delivered, per lb of alloy.
 Carload, bulk 7.00¢

Boron Agents

Contract prices per lb of alloy, del. Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B \$5.25

Bortam, f.o.b. Niagara Falls
 Ton lots, per pound 45¢
 Less ton lots, per pound 50¢

Corbortam, Ti, 15-31% B, 1-3% Si, 2-4% Al, 1-2% C, 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
 Ton lots, per pound 10.00¢

Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots \$1.20
 F.o.b. Wash., Pa.; 100 lb up
 10 to 14% B85
 14 to 19% B 1.20
 19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
 No. 1 \$1.00
 No. 6 48¢
 No. 79 50¢

Manganese-Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
 Ton lots \$1.46
 Less ton lots 1.57

Nickel-Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
 Less ton lots \$1.30

Silicaz, contract basis, delivered.
 Ton lots 45.00¢

COPPER—BRASS—BRONZE
PERFORATED
TO YOUR REQUIREMENTS
SEND US YOUR DRAWINGS FOR PRICE
PERFORATED METALS
FOR ALL INDUSTRIAL USES
ALL SIZE AND SHAPE HOLES—ALL METALS
ARCHITECTURAL GRILLES
DIAMOND MFG. CO.
BOX 28 Write for Catalog 35 WYOMING, PA.

Tabor
ABRASIVE
CUTOFF
MACHINES

3-H.P. line—wet and dry cutting, bevel or rt. angle.
Capacity: 3/4" solids; 2" tubing; 2' x 6" lt. sheet
formed sections; 1/2" x 1" flats.

10-H.P. line—wet cutting, rt. angle or bevel. Ca-
pacity: 2 1/2" solids; 3" x 3/4" angles; 4 1/2" tubing; 7/8" x
3" flats. Write for literature. Specify shape, size and
material to be cut.

TABOR MANUFACTURING CO.
6222 Tacony Street, Phila. 35, Pa.



*To Lower
your Overhead..*

BROWNING ELECTRIC
TRAVELING CRANES AND HOISTS
up to 125-TON CAPACITY

VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

STAMPINGS

Since 1905
Hubbard
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PARTS
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Consult us
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SUPERSALESMAN

96 Years' experience, has

excellent contacts with 97%

of the buying power in the

metalworking industry. Will

make over 120,100 calls

every week—*The Iron Age*

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS

Ingersoll Rand 33" x 20 1/2" x 24". Complete with 635 H.P. G.E. Syn. Motor 2300/3/60 2873 cu. ft. Worthington 29" x 21" & 10 1/2" x 21". Complete with Elec. Equipment

BAR TURNING MACHINES

2 1/2" Medart Type HF-2 Bar Turning Machine
6" Medart Type RFG-6 Bar Turning Machine

BENDER

Parker Model D848 Tube Bender, Motor Driven Capacity 3" O.D. Light Gauge Steel, Aluminum or Copper Tubing. Motor Dr. Mandrel Extractor

BENDING ROLL

No. 6 Millis & Jones Pyramid Type Plate Bending Roll, Capacity 16' x 3/4" Plate Complete with Electrical Equipment

BULLDOZER

#9 William White Bulldozer, Motor Driven With 50 H.P. Motor

CRANE—ROUSTABOUT

Hughes Keenan Roustabout Crane Model MC-4 25' Gooseneck Boom, Mounted on Tractor. Equipped with pneumatic tires

CRANE—TROLLEY

40 Ton Shaw-Box Trolley, Equipped with 15 H.P. G.E. Motor. Gauge of Trolley 7'6". Lift 80'. New 1942

FLANGING MACHINES

3/4" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment and numerous dies

No. 3 Blue Valley Flanging Machine. Will flange flat heads from 48" to 10' or 12' dia. Silent chain drive with A.C. Motor. Equipped with air cylinder and hydraulic pump

FORGING MACHINES

2" AJAX Upsetting and Forging Machine
5" National High Duty Forging Machine Suspended Header Slide—Guided Over and Under Arm; 50 H.P. A.C. Motor

FURNACES—MELTING

400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little used.

15 ton Heroult Model V-12 Electric Melting Furnace, Top Charge hydraulically operated. Complete with Transformer Equipment

PLANERS

48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

PRESS—HYDRAULIC FORGING

1000 Ton United Steam Hydraulic Forging Press Quick Acting Stroke (Daylight) 4". Distance Between Columns 31". RtoL 72" Intensifier and Accumulator Included, also 8000 lb. Alliance Straight Line Manipulator. NEW 1942

PRESS—HYDRAULIC WHEEL

100 ton Elmes Inclined Hydraulic Wheel Press, 72" Between Parallel Bars, Complete with Pump & Motor

ROLLING MILLS

12 1/2" x 16" Philadelphia Two High Cold Rolling Mill, Complete with Pinion Stand, 75 H.P. Motor 440/3/60, Starter and Controls, Incl. Coiler

18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill, Complete with Elec. Equip.
20" x 24" Philadelphia Two High Cold Rolling Mill, Complete with Pinion Stand, 250 H.P. Motor 440/3/60, Starter and Controls

SAW

No. 75 United Sliding Frame Saw, 52" Dia. x 3/4" Thick Blade, 48" Stroke, Complete with Elec. Equipment

TESTING MACHINES

10,000# Olsen Universal Wire Testing Machine
20,000# Southwark S10C Universal Hydr. Testing Machine

120,000 lb. SOUTHWARK-TATE-EMERY Universal Hydraulic Testing Machine LATE
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine

WELDERS

700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide
40 KVA Sciaky, Spot Welder, 36" Throat 440/3/60 operation

RITTERBUSH & COMPANY INC.

50 Church Street, New York 8, N. Y.

Phone—Cort 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Opinions Differ—Wide divergences of opinion on the value of CPR 80 (OPS order establishing price ceilings on used machine tools) exist in the Cleveland market. One faction is relieved that OPS is reportedly working on revisions to the order.

Some local Office of Price Stabilization officials complain that the order permits exorbitant prices for older tools. Used machine tool people are pressing their case that the Jan. 25, 1951, base period established by CPR 80 does not consider the subsequent rise of new tool prices. They say the base period should be more current to reflect these new tool rises.

Skilled Shortage—Rebuilders are suffering a little more acutely from the shortage of skilled help. One rebuilder in Cleveland is from 8 to 9 weeks behind in orders. This is insignificant when compared to long delivery dates for new machine tools. The 2-month or so rebuilding delivery date seems to hold true for most of the rebuilding trade in the Cleveland area.

One shop has had much difficulty in getting spare parts. To overcome this shortage it is machining and making these parts itself. Objection to this procedure is that parts thus become more expensive—but nowadays time seems to counterbalance expense.

Cleveland Demand—Boring mills are in high demand in Cleveland. Gear machines are in short supply but some demand pressure has been lifted from grinders. Many shops in this area are able to fill only from 4 to 10 pct of inquiries. This is largely due to the scarcity of new machines (plaguing every district). Some dealers say that pricing regulations are a major obstacle to turnover.

The trade reports that more defense subcontractors are interested in entering the used market. In this way demand for the

older machine may be stimulated. Smaller subcontractors are reported keen on economizing. This may further encourage loosening up of the older machine market.

Red Tape—One of the most bitter gripes heard in Cleveland concerns miles of government red tape involved in getting replacement parts. The filing of forms and other papers makes the task burdensome. Depleted stocks of parts manufacturers worsen the situation.

Not all rebuilders can solve their problems by making parts for themselves. They may have limited machine shop facilities, not enough skilled help, and not enough time.

Loses Money—More on the Cleveland aspect of the pricing muddle is related by one dealer. A 1911 72-in. King boring mill priced at \$1800 had to be sold for \$1500 to conform with the OPS pricing edict. This made the dealer gnash his teeth in rage.

It seems that this is one of the few old machine tools that is comparable to later models and therefore commands a higher price than other tools its age.

Reserve Rebuilding—Dribs and drabs of rebuilding work will appear all over the country when Air Force contractors try to rebuild tools picked out from the Air Force reserve tool site at Ford Motor's Chicago aircraft engine plant. This pool had already been depleted to fill high priority Ford needs. Not many desirable tools were left for manufacturers' representatives.

Work on government surplus tools is difficult. Heavy grease must be removed laboriously. Sometimes the preservative has damaged wiring systems. But this work has one valuable advantage. Rebuilders can use priorities to get needed replacement parts.

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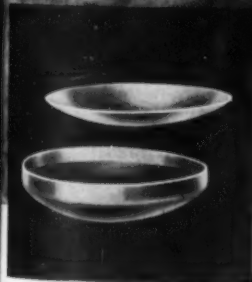
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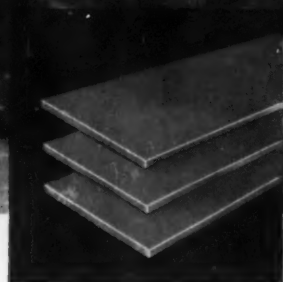
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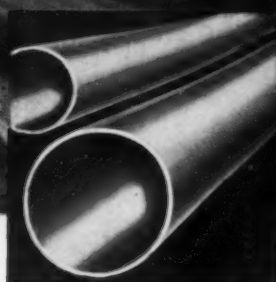
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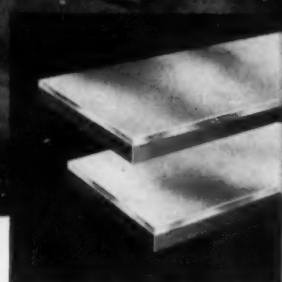
Flanged and
Dished Heads



Carbon Plates



Large Diameter
Steel Pipe



Stainless-Clad
Steel Plates

CLAYMONT STEEL CORPORATION

CLAYMONT, DELAWARE

SUBSIDIARY OF THE COLORADO FUEL & IRON CORPORATION

Farval helps sheet leveler show \$2500 monthly saving

WITH this machine, a kitchen range manufacturer saves nearly \$2,500 a month. It is a McKay Leveler, through which steel sheets are passed to correct irregular grain structure—a cause of breakage in deep drawing operations.

Steady, economical operation of the leveler is insured by a Farval Centralized Lubrication System. Forty-two bearings are served by a manual pumping unit.

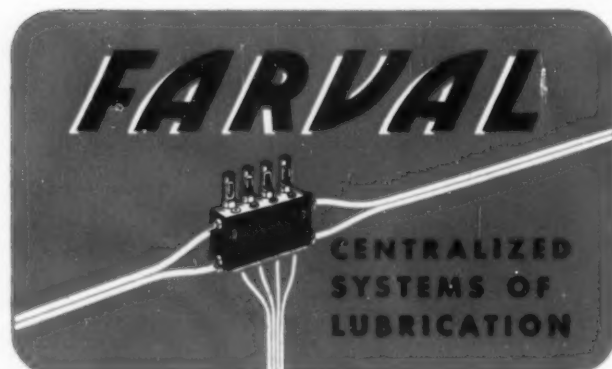
With Farval on the job, it isn't necessary to stop the machine for periodic oiling, because a few quick strokes of the pump lever once or twice each work shift lubricate every bearing—adequately and without waste. Nor is it ever necessary to shut down the leveler for repair or replacement of bearings damaged or worn out by faulty lubrication.

Just as the McKay Leveler soon pays for itself in savings, so also a Farval system on any machine soon pays for itself—by the savings it brings in bearing expense and lubricant cost, not to mention oiling labor and production time saved.

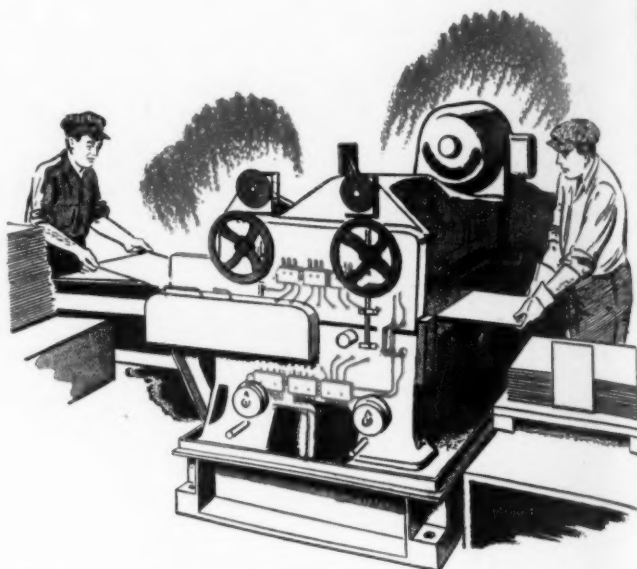
Farval is the original Dualine system of centralized lubrication, proved practical in 20 years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

Write for Bulletin 25 for full details. The Farval Corporation, 3252 East 80th Street, Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



← FARVAL—Studies in Centralized Lubrication No. 118



McKay Sheet Leveler on which all bearings are Farval lubricated. Farval Centralized Lubrication Systems, manually operated and automatic, lubricate over a million bearings in the iron and steel and metal working industries alone.

CO

AIR COMP
12"x10" I
Bych.
Comer.
50x21 &
Crate
50" &
855 H.P.

VALER

Model 12-

Size 40

BAR TURN

2 1/2" Mod

8" Modar

BENDERS-

Model 35

Capacity

aluminum

steel to

No. 500

100 ton

Discs f

BENDING

8 1/4" B

12 1/4" P

18 1/4" C

18 1/4" N

BRAKE-L

18 1/4"

Size N

BULLDOZ

#9 Willi

H.P. 1

CHARGE

6000# B

handli

gasoli

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handli

reel-

CRANES-

5 ton E

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15 to

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GEAR

800

2:1

1200

600

600

300

GRIND

6"x1"

Re

Conf

Liqui

Dec

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS

15"x10" Ingersoll Rand Class ER-1, With 75 H.P. Synch. Motor 2300/3/60. Complete with After Cooler, Air Receiver, Etc.
30"x11" 18"x21" Worthington, With 2300 Volt 60 Cycle Motor and all operating equipment
32" x 20 1/2"x24" Ingersoll Rand Compressor with 650 HP G.E. Syn. Motor 2300/3/60

BALER

Model 12-P Logemann Baler, Box 92"x18"x24". Bale Size approx. 12"x11"x18"

BAR TURNING MACHINES

3 1/2" Modart Type HF-3 Bar Turning Machine
6" Modart Type RFG-6 Bar Turning Machine

BENDERS—PIPE

Model B548 Parker Automatic Power Tube Bender. Capacity 1/2" to 3" O.D. Soft annealed copper and aluminum alloy tubing & light gauge soft annealed steel tubing
No. 500 Wallace Bending Machines, Capacity 1 1/2"
100 ton Baldwin Southwark Hydraulic Pipe Bender. Dies for bending pipe 3 1/4" to 8" incl.

BENDING ROLLS

8 1/4" Hendley Whitmore Initial Type, Motor Drive
8 1/4" Pyramid Type Plate Bending Roll, M.D.
12"x4" Cleveland Pyramid Type, Motor Driven
10"x4" Hilles & Jones #8 Pyramid Type

BRAKE—LEAF TYPE

10"x14" Drels & Krump Leaf Type Bending Brake. Size No. 187, Motor Driven

BULLDOZER

#9 Williams White Bulldozer, Motor Dr. With 50 H.P. Motor

CHARGING MACHINES

4000# Brosius Floor Type, Gasoline Driven, Peel for handling O.H. Charging Box. Rubber tired Buda gasoline engine
4000# Brosius Floor Type, Motor Driven, Peel for handling O.H. Charging Box. Equipped with cable reel—Both NEW 1942

CHANGES—OVERHEAD ELECTRIC TRAVELING

5 ton Robbins Myers 28'6" Span 230/3/60
10 ton Ohio Engr. Co. 60' Span 220/440 A.C.
10 ton P & H 80' Span 230 Volt D.C.
With 3 Ton Auxiliary Hoist
10 ton Milwaukee 48' 230 Volt D.C.
15 ton Shaw 28' Span 440/3/60
15 ton Niles 60' Span 230 Volt D.C.
15 ton Toledo 46' Span 220/3/60
30 ton Morgan 37'6" Span 230 Volt D.C.
30 ton Northern 53' Span 440/25/3 A.C.
With 10 ton Auxiliary Hoist
100 ton Whiting 70' Span 230/3/60
With 10 ton Auxiliary Hoist

CRANE TROLLEY

40 ton Shaw-Bon Trolley, With 15 H.P. G.E. Motor
Gauge of Trolley 7'6", Lift 80' NEW 1942

DRAW BENCH

340 ton Clearing Machine Co., Hydraulic Draw Bench
Two column Type with Double Action Piston, Stroke of Slide 200"

DRILL—MULTIPLE

Fox 57-H 6 Spindle Vertical Hydraulic Drilling Machine, Complete with Elec. Equip.

FLANGING MACHINE

4" McCabe Pneumatic Flanging Machine, Pneumatic Holdowns, Circle Flanging Attachment and numerous dies

FORGING MACHINES

15 1/2", 5", 3", 4", 5" Ajax
15", 5", 3", 4", 5" Ames
4" National High Duty Forging Machine, Suspended Header Slide—Guided Over and Under Arm, 50 H.P. A.C. Motor

FURNACES—ANNEALING

200 KW Continuous Electric Bright Annealing Furnace Heating Chamber 4'6" x 30' Long. Cooling Chamber 44' Long in two parts
Surface Combustion Radiant Tube Annealing Furnace. For bright annealing copper tubing, Hearth-heating zone 30' long 3' wide

FURNACES—HEATING

48 KVA Leeds & Northrup Home Furnace #9470-UB-25-10. With Controls. Work Space 21 1/2" dia. x 28" deep
60 KM Leeds & Northrup Home Furnace #9473-UB-28. With Controls. Work Space 32" dia. x 28" deep

FURNACES—HEAT TREATING

Electric Furnace Co. Rotary Furnace Hearth 31' Dia. x 5' wide, Sq. Ft. Hearth Area 436
Chamber 20' Long. Cooling Chamber 18' Long
275 KW Westinghouse Roller Hearth Furnace Heating Chamber 12' Inside Length, 54" Inside Width

FURNACES—MELTING

400 lb. Moore Type "UT" Melting Furnace. Top Charge. Complete with Transformer. New 1943—Little Used
15 ton Hercult Model V-12 Top Charge Hydraulically Operated Complete with Transformer Equip.

GEAR REDUCERS

800 H.P. Falk Single Herringbone Reducer Ratio 3:15:1
1200 H.P. Mesta Double Reduction Gear Ratio 20.52:1
600 H.P. Westinghouse Reduction Unit Ratio 3:76:1
600 H.P. Falk Single Herringbone Gear Reducer 360/40 RPM

GRINDERS

6"x18" Landis Cylindrical Grinder Hydraulic Infeed. Rapid Traverse, Electric Timer

HAMMERS—BOARD DROP

1200 lb. Chambersburg
1000, 3000 lb. Billings & Spencer

HAMMERS—ROPE DROP

32" x 36" 1 Ton Rope Drop Hammer, Motor Driven with 10 H.P. A.C. Motor
42" x 62" 3 ton Rope Drop Hammer, Incl. two 11 H.P. A.C. Motors

HAMMERS—STEAM DROP

1000 lb. Chambersburg
1500, 2000 lb. Erie

HAMMERS—STEAM FORGING

1200 lb. Massillon Single Frame
1500, 1600, 2000, 3000, 4000, 8000 lb. Chambersburg
600, 1500, 2500, 6000 lb. N.B.P.
800, 1100, 1500, 2000, 2500, 3500 Erie

HAMMERS—MISCELLANEOUS

No. 2B Nazel Hammer, Motor Driven
No. 6N Nazel Hammer, Geared Motor Drive
500 lb. Beaudry Hammer, Motor Driven

LEVELER—STRETCHER

Model 1190 Torrington Hydraulic Stretching Machine
Capacity Sheets 14' long x 5' wide. Complete with Pump and Motor

MOTOR

40 H.P. Variable Speed Motor 440/3/60

WE OFFER A COMPLETE LIQUIDATION SERVICE ON ANY BASIS WHICH CIRCUMSTANCES INDICATE WOULD BE MOST BENEFICIAL, WHETHER BY AUCTION, PRIVATE LIQUIDATION OR OUTRIGHT SALE CONSULTANTS IN MANUFACTURING PROBLEMS FOR OVER A QUARTER OF A CENTURY THERE IS NO SUBSTITUTE FOR EXPERIENCE CONTACT US IN CONFIDENCE WITHOUT COST OR OBLIGATION

MOTOR GENERATOR SETS

1000 KW Westinghouse Generator 250 Volt D.C. with 1440 H.P. Westinghouse Synchronous Motor 2300 volt 25 cycle 3 phase
1800 KW General Electric Generator 250 Volt D.C. With 2500 H.P. G.E. Motor 2300/3/60

NAIL MAKING MACHINES

No. 1 1/4 National—Sizes 10D, 12D, 16D, 20D, 30D
No. 3 National—Size 6D
No. 2 Glader Sizes 6D, 7D, 8D, 9D
Angell Sizes 10D, 12D, 16D, roofing

PLANERS

32x35"x10' Niles One Ball Head
48x48"x12' Niles-Bement-Pond, Four Head
60x60"x12' Niles-Bement-Pond, Four Head
72x72"x12' Niles-Bement-Pond, Four Head

PRESS—EMBOSSING & COINING

Bliss #28-A 800 ton Double Geared Knuckle Joint Press, With 8 Station Dial Feed

PRESSES—HYDRAULIC

75 ton Williams White Straightening Press, 27" Stroke, Bed 8' x 10' 3/4" Dia. Ram
150 ton Beatty Hydraulic Extrusion Press. Work Cylinder 32" dia. x 30" long. Complete with Pump and Motor
150 ton Elmes Double Action Hydr. Press 20" Stroke of Blankholder, 32" Stroke of Punch Slide, 38" x 37" Bed Area
200 ton Bliss Hydrodynamic, 48" Stroke, Bed Area 24" x 24". Hydr. Pump Incl.
500 ton Southwark Open Throat Hydraulic Press, 12" Stroke, Platen 56" x 56"
700 ton Elmes Forming Press, 27" Stroke, Platen Size 40" x 58"
1000 ton United Steam Hydraulic Forging Press Quick Acting, Stroke 48". Distance between columns 31" Rtd. 72". With 3000 lb. Alliance Straight Line Manipulator NEW 1942
1500 ton Mesta Steam Hydraulic Forging Press, 48" Stroke, 8' x 3'6" Between Columns—including Wellman Manipulator Rotating Type

PRESSES—HYDRAULIC WHEEL

100 ton Elmes Inclined Hydr. Wheel Press, 72" Between Parallel Bars, Complete with Pump and Motor
100 ton Caldwell Hydr. Wheel Press, 38" Between Parallel bars
250 ton Caldwell Hydr. Wheel Press, 38" Between Parallel Bars
300 ton Niles-B-P Hydr. Wheel Press, 48" Between Parallel Bars
400 ton Niles-B-P Hydr. Wheel Press, 48" Between Parallel Bars

PRESSES—STRAIGHT SIDE

No. 260-D-120 Cleveland 250 ton Straight Side Press, 24" Stroke, 60" x 120" Bed Area
No. 650 Bliss High Production Press Flywheel Type 1 1/4" Stroke, Face of Slide 8" x 16 1/4"
525 Ton Cleveland Double Crank, Double Geared 60"x120" Bed Area, 24" Stroke, Three 50 ton cushions, Air Clutch, Elec. Equipment
No. 675B Bliss Single Geared, 1 1/4" Stroke, Double Roll Feed & Chopper, 10 H.P. A.C. Motor

PRESSES—TOGGLE DRAWING

No. 14B Bliss Toggle Drawing Press, 52" Between Uprights, 24" Stroke of Blankholder, 23" Stroke of Plunger
No. 183 1/2 Toledo 200 ton Capacity. Area of Ram 39"x48", Inner Stroke 17", Outer Stroke 12"

PRESSES—TRIMMING

No. 3 Erie Flywheel Drive Trimming Press, 3 1/4" Stroke, 13" Between Guides
100 ton Chambersburg Hydraulic Trimming Press 18" Stroke, 30" Between Uprights
No. 306 1/2 Bliss, 3" Stroke—New 1942, Equipped with Slide Shear
No. 10 Erie Geared 350 ton Trimming Press 6" Stroke, 26" x 36" Bed Area

PUNCH—BEAM

Long & Allstatter Double End Beam Punch. Capacity Beam Punch End—Punch flanges and web 2 1/2" I-beam and smaller

PUNCH & SHEAR COMBINATIONS

No. 1 1/2 Buffalo Universal Ironworker, M.D. Capacity Rounds 1 1/2", Sq. 1 1/2". Angles 2x2 1/2". Punch 1" thru 1/2"
No. 1 1/2 Buffalo Universal Ironworker, Motor Driven Capacity Punch 1 1/2"x1 1/2", Shear Rounds 1 1/2" Squares 1 1/2" 4x4x16" Angles
No. 1 Ryerson King Universal Ironworker, Motor Dr. Capacity Punch 1 5/8"x1". Shear 2 1/4" Round. Squares 1", Angles 6x6x1/2"

ROLLING MILLS

9 x 20" Schmitz Single Stand Two High
12"x10" Single Stand Two High, Comp. with Elec. Equip.
12"x24" Waterbury Farrel Two High
18"x24" Waterbury Farrel Two Stand Two High
20"x24" Single Stand Two High, Comp. with Elec. Equip.
30"x36" Poole Two Stand Two High
22"x40" Continuous Single Stand Two High

ROLLS—FORMING

Yoder 9 Stand Roll Forming Machine, 17" Between Uprights, Handles 1/4" mild steel

ROLLS—PLATE STRAIGHTENING

51" Plate Straightening Roll, 7 Rolls 10" Dia.
56" Niles Plate Straightening Roll, 7 Rolls 13" Dia.

SAW

No. 75 United Sliding Frame Saw, 52" Dia. x 1/2" Blade, 48" Stroke, Complete with Accessory and Electrical Equipment

SHEARS—ANGLE

Long & Allstatter Double Angle Shear, Model B. Capacity 6x6x1/2". Complete with Elec. Equip.
No. 5 Cleveland Double Angle Shear 8x8x1" Mounted on Turntable, Geared Motor Drive

SHEARS—BAR

No. 2 LH Lewis Open End Bar Shear, Motor Drive, Capacity 1 1/2" Round

SHEARS—ROTARY

No. 69 Quickwork Rotary Shear, 3/4" Capacity
No. 100 Kiling Rotary Shear, 1" Capacity

SLITTER

72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS

Sutton Single Cross Roll Straightener, Motor Driven. Capacity 1/4" to 1 1/4" Tubes or Bars, Tinkens Roller Bear., Complete with Pump and Motors

SWAGING MACHINES

No. 3A Standard, Capacity 1/2" Solid 1 1/2" Tube
No. P4 Langeller, Capacity 1 1/4" Tubing
No. 408 Etne Swager, Capacity 4" Tubing, Length of Dies 8"

TESTING MACHINES

10,000# Olsen Universal Wire Testing Machine
20,000# Southwark Model 810C Hydr. Universal
50,000# Riehle Universal Testing Machine
120,000# Baldwin-Tate-Emery Universal Hydr.
200,000# Riehle Universal Testing Machine
300,000# Southwark Emery Universal Hydraulic

THREAD ROLLER

Watson-Flag Precision Thread Rolling Machine Model C, Capacity .138" to 2 1/4" Dia. Complete with Elec. Equipment

TRANSFORMERS

1500 KVA Westinghouse Transformer, 60,000 volt 60 cy. primary, 480 volt secondary
1800 KVA Westinghouse Transformer, 13,300 volt 60 cy. primary, 230 volt secondary
7500 KVA General Electric 33,000 to 13,000 volts, 4 phase, 60 cycle

WELDERS

150 KVA Federal P2-12A Press Type Spot Welder 440 volt single phase 60 cycle
Taylor Windfield Press Type Spot Welder, Type HWRD-36-3 HI-WAVE
700 KVA Federal Flash Welder, Enclosed 11m Type Ring Size 6" to 35" Dia. x 12" Wide, 440 Volts, Single Phase

WIRE MACHINERY

7-Bobbin Planetary Strander, Bobbins 4 1/2" gage, 7 lb. capacity
7 & 12 Bobbin Planetary Strander, Bobbins 4" gage, 11 lb. capacity

Manufacturing

ITTERBUSH & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8

Telephone: Cortlandt 7-3437

Equipment

Confidential Certified Appraisals
Liquidations — Bona Fide Auction Sales Arranged

December 27, 1951

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

THE CLEARING HOUSE

MILES' QUALITY

AUTOMATIC, 5/8" New Britain 6 spdl.
AUTOMATIC, 1 1/2" Cone 4 spindle
AUTOMATIC, No. 454 New Britain Chucking
AUTOMATIC, 14" x 19" Fay
BORING MILL, 2 1/2" Cleveland horiz.
BORING MILL, 4" Detrick Harvey floor
BORING MILL, 84" Gisholt vertical
BROACH, No. 1 Foote Burt twin surface
BROACH, 2 ton American hor. hydr.
BULLDOZER, No. 22 Williams & White
DRILLS, Nos. 121, 217, 310, 315 & 321 Baker
DRILLS, 20" & 24" Barnes camel back
DRILL, 24" Cincinnati Bickford
DRILL, 16 spdl. No. 13 Natco
DRILL, 12 spdl. No. 10 Defiance rail
DRILL, 3" & 6" Dreses radial
DRILL, 1 & 4 spdl. Avey hydr. feed
GEAR HOBBER, 8H, 12H, 16HS, 18H G. & E.
GEAR HOBBER, No. 130 Cleveland
GEAR HOBBER, No. 12 Barber Colman
GEAR HOBBER, No. 1 Lees Bradner
GEAR SHAPER, Nos. 6 & 7125A Fellows
GEAR SHAVER, 8"-12", Red Ring
GRINDER, CENTERLESS, No. 2 Cincinnati
GRINDER, CYLINDER, 10 x 18 Landis
GRINDER, INTERNAL, Nos. 16-28, 16F28 &
24-36 Bryant
GRINDER, INTERNAL, Nos. 72A3 & 72A5 Heald
GRIDER, SURFACE, Nos. 16A2 & 10 Blanchard
GRINDER, SURFACE, 12" & 16" Heald No. 22
GRINDER, SURFACE, 14" x 48", No. 5 Abrasive
GRINDER, THREAD, No. 33 Excell
GRINDER, UNIVERSAL, 14" x 36" Landis
HAMMER, No. 5N Hazel pneumatic
HAMMER, 40 lb. Bradley helve
KEYSEATER, Nos. 4 & 5 Mitts & Merrill
LATHE, 36" x 16" Bridgeford, GH, QCG
LATHE, 26" x 15" Wickes, GH, QCG
LATHE, TURRET, 4 1/2" No. 3A Warner & Swasey
LATHE, TURRET, Nos. 3 & 7 B. & O. Cone,
motorized
MILLER, Nos. 2A & 2AS Milwaukee
MILLER, No. 2 Cincinnati, plain & vert.
MILLER, No. 4-36 Cincinnati, Hydromatic
MILLER, Nos. 1, 2 & 3 Kent-Owens hand
MILLER, Nos. 1-8 & 1-4 Kent-Owens hydraulic
MILLER, 18" & 24" Cincinnati duplex
MILLER, 26" x 24" x 14" Ingersoll, planer type
MILLER, 48" x 21" x 22" Ingersoll, planer type
MILLER, THREAD, 2 C Hall planetary
MILLER, THREAD, Nos. 4, 6 & 36 CT Lees
Bradner
MILLER, Type 45 Productomatic
MILLER, 30", 42" & 84" Ingersoll rotary
PLANER, 36" x 36" x 8" Gray, 3 heads
PLANER, 36" x 36" x 10" Betts, 4 heads
PLANER, 48" x 48" x 14" Woodward, 4 heads
PRESS, No. 304 Bliss straight side
PRESS, Nos. 245 1/2 & 279 Hamilton S.S.
PRESS, No. 77 1/2 Bliss S.S. trimming
PRESS, 650 ton No. 570 Toledo forging
PRESS, 32 tons No. 61 Cleveland OBI
PRESS, 45 ton No. 73 Consol. O.B.I.
PRESS, Nos. P1, P2, P3 & P5 Ferracut
PRESS, 100 ton HPM hydraulic
PRESS, CA4 Ferracut adjustable knee
PRESS, 150 ton Model EG-52 Ferracut
PRESS, 1000 ton Bliss No. 27 knuckle-joint coining
800 ton No. 665 Toledo coining
400 ton No. EG54 Ferracut coining
Nos. 245 1/2 & 279 Hamilton SS
No. 77 1/2 Bliss S.S. trimming
PUMPS, Four Vickers hydraulic
RIVETERS, No. 5A Grant pedestal-type hammer
REAMERS, Three Houde specials
SLOTTER, 16" Bement Miles crank
SAWS, Two No. 816S Kalamazoo metal-cutting band
SAW, 36" Tannewitz metal-cutting band
SAWS, 4", 7", and 8" Nos. 12, 14, and 17
Higley cold-cutting
SHAPERS, 34" and 27" Morton draw cut
SHAPERS, Two 24" Queen City
SHEAR, 38" throat New Doty No. 17F
TAPPER, 1-spindle Natco No. E5 vertical
TAPPERS, Two No. 71 Ettco
TAPPERS, Two Greenlee 3-way special
TAPPER, No. 2 Garvin
THREADER, 2" Landis pipe threading and cutting
THREADERS, Two 3/4" Landis, double-spindle
THREADER, 2" Oster Rotary head
UPSETTER, 2" National, steel frame
UPSETTERS, Two 4" Ajax heavy duty twin gear
WELDER, 200 KVA Federal flash butt
WELDER, 100 KVA Thompson automatic spot
WELDER, 25 KVA Federal spot, 20" reach
WELDERS, 12", 14" and 16" 12 and 18 KVA
Amer. Elec. Fusion Co. spot

MILES MACHINERY CO.

BOX 770

SAGINAW, MICHIGAN

GUARANTEED TOOLS

60"x20" NILES BEMENT POND Geared Head En-
gine Lathe, rapid traverse
56"x18" CMC Heavy Duty Lathe, 24 speed geared
head, power rapid traverse, 30 HP AC motor
24"x10" centers LODGE & SHIPLEY 12-Speed
Geared Head Engine Lathe
20"/40"x12" NEBEL Series AG Sliding Bed Gap
Lathe, new 1943
14"x66" centers HENDEY No. 3 Manufacturing
Lathe, new 1937
No. 2B FOSTER Turret Lathe, 3 1/4" bar capacity,
hardened ways, Timken spindle, new 1935
42" BULLARD New Era Type Vertical Turret
Lathe, AC-MD
24" BULLARD New Era Type Vertical Turret
Lathe, side head, motor drive
100" BERTRAM (Niles Patterns) Vertical Boring
Mill, 2 heads on rail, rapid traverse, new 1932
No. 1 DOUGLAS Plain Horizontal Mill, table 8"
x 32", power feeds, motor in base, No. 40
taper, new 1942
No. 2B KEARNEY & TRECKER Plain Horizontal
Mill, AC-MD
No. 2B KEARNEY & TRECKER Vertical Mill, motor
in base, rapid traverse
No. 4B KEARNEY & TRECKER Plain Horizontal
Mill, motor in base, rapid traverse, vertical head
No. 6 TOLEDO O.B.I. Press, 70 tons
25A HEALD Rotary Surface Grinder, 24"
diameter, magnetic chuck
No. 72AS HEALD Sizematic Internal Grinder
14"x48" MATTISON Hydraulic Surface Grinder,
new 1939 (April delivery)
No. 5 HILLES & JONES Pyramid Type Plate Bend-
ing Rolls, 14" diameter top roll, 12" diameter
bottom roll, 10" long, drop end housing, 30 HP
slip ring motors
No. 60 NEW BRITAIN 1"—6 Spindle Automatic
Screw Machine, new 1943
No. 36H GOULD & EBERHARDT Automatic Gear
Hobber
36"x36"x10" G. A. GRAY Maxi-Service Planer
75 Ton HENRY & WRIGHT Dieing Machine

**O'CONNELL
MACHINERY CO.**

Tel: BAiley 5800

1693 GENESEE ST. BUFFALO 11, N.Y.

16-Y-28 Bryant Internal Grinder
6 D Potter & Johnston Automatic
Chucking Machine
#61A Fellows Gear Shaper
#30 Waterbury Farrel Thread Rollers
#0 Brown & Sharpe Automatic Screw
Machine with Turner Drives
#3 Barber Coleman Hobbing Machine
G1-A Acme Gridley 1 1/2" Automatic
Screw Machine
16" Gould & Eberhardt Shaper
1—#0-18 Sundstrand Rigidmill
1—4' Arm Western Radial Drill 45"
column
1—4' Arm Western Radial Drill 50"
column

Hazard Brownell Machine Tools, Inc.
350 Waterman St., Providence 6, R. I.

CIMCO MACHINE TOOLS AT BARGAIN PRICES

Aurora 24" Upright Drill, #4MT, tapping
Defiance #3, Upright Drill, #5MT
Sellers 4T Tool Grinder, motor drive
Sellers 6T Tool Grinder, late type
Landis #2 Universal Grinder, cone drive
Landis 10 x 72 Plain Cylindrical Grinder
Brown & Sharpe #12 Plain Grinder, reversing mechanism
Micro Internal Grinder, Model F.G.
Heald #70A Internal Grinder
Heald #78 Centerless Internal & Cylindrical Grinder,
late type, complete
Landis #26 Precision Thread Grinder, New 1944
Nazel 6N Pneumatic Power Forging Hammer
Cincinnati 24 x 24 x 6" Double Housing
Cleveland 25 x 20 x 6" Openside Planer
Universal 24" Openside Shaper Planer
American 18" x 6", 3 SCD 56" center distance, 1 1/4"
hole in spindle
Blount Model B-3 Special Application Lathe for Turning,
20" swing, 2 1/2" hole in spindle, 54" centers
Monarch 20" x 6", motor drive, 8 speed, 1 1/2" hole in spindle
Bradford 20" x 18", 4 SCD 12" center distance, Lou
change
American 38" x 38" center distance, 2 1/2" hole in spindle,
first class
American 48" x 10" centers, 2 1/2" hole in spindle, first class
Hill Planetary Style D Miller
Calburn 54" Vertical Boring Mill, 2 heads
Glenson 3" Bevel Gear Generator, cone drive
Schumacher & Boys 36" x 24" Lathes, cone drive thru
Turner Uni. drive, 15" center distance
Lodge & Shipley 30" x 16" GH lathes, 12 spindle speeds,
9" center distance, taper attachment
Lodge & Shipley 24" x 12" bed, 5 SCD, 6" center dis-
tance, taper attachment
American 20" x 12" GH Lathes, 8 spindle speeds, 3 1/8"
centers, complete with taper
Smith & Mills 14" shaper, 4 SCD, motorized
Gould & Eberhardt 18" BG shaper, motor drive thru
gear box
Barker 18" shaper, 4 SCD
Gould & Eberhardt 32" shaper, motor drive thru gear
box, complete with vise
Heald 47A Borematic, 3 heads, late type
Heald 72AS Internal Grinder, 1 head
Allen 4 spindle Drill Press
Read-Prentiss Geared Head Lathe, 23" x 72" centers,
Timken bearing
Gould & Eberhardt 18H Hobber
Cincinnati 1-18 Plain Automatic Miller
Ohio #2 Plain Milling Machine, rectangular overarm
King 42" Vert. Mill, 2 heads
Landis 10 x 18 Plain Grinder, late type
Heald #50 Internal Grinder
Cincinnati 2-24 Plain Automatic Miller
LeBlond #2 1/2 Univ. Miller, 3 SCD
Brown & Sharpe #10 Tool & Cutter Grinder, late type
Gould & Eberhardt 96H Hobber
Hammond 14" Carbide Tool Grinder
Cincinnati 36" Shaper Planer
Brown & Sharpe #1 Univ. Grinder
LeBlond #2 Univ. Miller, 3 SCD.



*This Is A Partial List
Of Our Stock. Send Us
Your Inquiries.*

**CINCINNATI MACHINERY
COMPANY, INCORPORATED**
209 E. Second Street
CINCINNATI 2, OHIO

74" UNGERER BACKED UP LEVELER

Late Type—Rebuilt
Capacity 16 Gauge and Lighter
Complete With
Motor and Controls,
Including Runout Table

LANG MACHINERY COMPANY

28th St. & A.V.R.R.

Pittsburgh 22, Pa.

THIS PAGE IS FULL OF LATE-TYPE MACHINE TOOLS

You can be sure used and rebuilt machine tools are top quality when you buy from Laurens. Here's why . . . Three generations in the business all over the world . . . No compromise on high standards . . . Unconditional guarantees.

LATHES

14" x 6' bed LeBLOND Engine Lathe, Late
18" x 6' bed LEHMAN Engine Lathe, Late
32" x 34" bed LeBLOND Heavy Duty Engine Lathe, New 1943, with raising blocks to swing 48"
Model "Z" 14" x 60" MONARCH Magnamatic Production Lathe, New 1937
14" x 33" FAY Automatic Lathe
No. 6 WSL 12" x 18" REID Smallpiece Production Lathe, New 1941
No. 9 WSL 18" x 22" REID Smallpiece Production Lathe, New 1942
Model LR SENECA FALLS Lo-Swing Production Lathe, Late
Two—Model No. 616 CLEVELAND Single Spindle "Rigid-turners," New 1943
No. 2 LeBLOND Gun Boring Lathe, Late

TURRET LATHES

No. 2 BARDONS & OLIVER Geared Electric, New 1941, with bar feed
Three—No. 3 GISHOLT Universal Ram Type, New 1940/2, bar feed, collet chuck
No. 4 GISHOLT Ram Type Universal, Pre-selector head, New 1941, bar feed, collet chuck
No. 4R LIBBY Ram Type Universal, Late
Two—No. 5 GISHOLT Ram Type Universal, New 1941-2—one for chuck work, one with bar feed, collet chuck
No. 1A WARNER & SWASEY Saddle Type, collet chuck, New approx. 1935-36
No. 5D POTTER & JOHNSTON Automatic Chucking Machine, New 1940
Two—GISHOLT Simplimatic Production Lathes

BORING MILLS

42" BULLARD Vertical Turret Lathe, New-Era Type
No. 257 GIDDINGS & LEWIS Horizontal Boring Mill, New 1942
No. 32 LUCAS Horizontal Boring Mill
No. 1 DETRICK & HARVEY Floor Type Horizontal Boring Mill, 4" capacity
No. 2 DETRICK & HARVEY Floor Type Horizontal Boring Mill, 5" capacity

AUTOMATICS

Three—Model OG BROWN & SHARPE, Late
Model A-9/16" CLEVELAND, New 1943
Model A-1 1/16" CLEVELAND, New 1940
Model B-1/2" CLEVELAND, New 1943
Model B-1 1/2"—18" CLEVELAND, Shaft Machine, New 1942

DRILLS

No. 217 BAKER Drill, Late
Model M-2 BARNES Hydram Drilling, Boring & Reaming Machine, New 1942
Model M-3 BARNES Hydram Drilling, Boring & Reaming Machine, New 1942
No. 53 SUNDSTRAND Drilling and Centering Machine, New 1942

PLANER

72" x 56" x 32" CINCINNATI Double Housing, 4 heads, belted motor drive

MILLING MACHINES

No. 5-48 CINCINNATI Hydromatic Production Mill
No. 2 SUNDSTRAND Electro-Mill, New 1941
Model 3VG REED PRENTICE Vertical Mill and Die Sinking, New 1940
Model 2HL KEARNEY & TRECKER Vertical Mill, New 1941
Two—8" x 16" HANSON WHITNEY Universal Thread Millers, Late
4 1/2" x 12" PRATT WHITNEY Thread Miller, Late
6" x 20" PRATT & WHITNEY Thread Miller, Late

GEAR MACHINERY

Two—3" GLEASON Spiral Bevel Gear Generators, New 1941-2
37" GLEASON Straight Bevel Gear Planer, New 1921
Two—No. 12 GLEASON Straight Bevel Gear Generator Tool Sharpeners, New 1941
10" PRATT & WHITNEY 2-wheel Hydraulic Helical Gear Grinder, Late
Model 50C 12 RED RING Precision Gear and Spline Grinder, 20" between centers, New 1942
Model No. 40 CROSS Single Spindle Gear Tooth Pointing Machine, Late
No. 158 FELLOWS Gear Burnisher, New 1943
FELLOWS Flat Top Helical Cutter Sharpener, New 1943
Five—No. 14 GLEASON Spiral Bevel Gear Grinders, New 1938-40
Five—No. 18 GLEASON Formate Zerol and Hypoid Gear Grinders, New 1947

PLAIN CYLINDRICAL GRINDERS

4" x 12" LANDIS Type "H" Plain Hydraulic Grinder, with hydraulic infeed and timer, New 1944
6" x 18" LANDIS Type CH Plain Hydraulic Grinder, Very Late
Two—10" x 18" LANDIS Type "C" Plain hydraulic Grinder, New 1941-2, hydraulic straight infeed
10" x 18" NORTON Type "C" Plain Cylindrical Grinder, New 1942, mechanical table traverse
No. 30 BROWN & SHARPE Plain Grinder, capacity 12" x 18", Late
14" x 48" CINCINNATI Plain Self-contained Cylindrical Grinder, New 1940, Filmatic Spindle Bearings

INTERNAL GRINDERS

No. 112 BRYANT Hydraulic Internal Grinder, New 1942
Several—No. 16-16, 16A-28 and 24-26 BRYANT Hydraulic Internal Grinders, New 1941-3
20" x 8" LANDIS Type "C" Hydraulic Internal Grinder, Late
No. 81 HEALD Gagematic Chuck Type Internal Grinder, Late
No. 72A3 HEALD Internal Grinder
No. 70A HEALD Internal Grinder, New 1941
No. 78 HEALD Centerless Internal Grinder, New 1942
No. 172 HEALD Hydraulic Gap Internal Grinder, New 1940, with 2" raising blocks, 40" swing

SURFACE GRINDERS

No. 5 BROWN & SHARPE Hydraulic Surface Grinder, Very Late, wet grinding, dust collector
No. 300 HANCHETT Vertical Spindle Hydraulic Surface Grinder, Late, 60" table travel, magnetic chuck
24" x 72" THOMPSON Hydraulic Surface Grinder, Late
14" x 36" PRATT & WHITNEY Hydraulic Vertical Surface Grinder, New 1941, magnetic chuck
22" x 60" PRATT & WHITNEY Hydraulic Vertical Surface Grinder, Late

MISCELLANEOUS GRINDERS

OLIVER Hydraulic Automatic Face Mill Grinder, New 1948
No. 2 CINCINNATI Centerless Grinder, New 1929
Two—CINCINNATI Centerless Lapping Machines, New 1940-42
No. 620 VAN NORMAN Automatic Radius Grinder, Late
No. 47 VAN NORMAN Automatic Radius Grinder, Late
No. 49 VAN NORMAN Automatic Radius Grinder, Late
No. 2 LANDIS Race-A-Way Radius Grinder, Late
Two—Model D-86 NORTON "Crank-O-Matic" Hydraulic Crankpin Grinder, New 1944
No. 31 EXCELLO Thread Grinder, New 1943
No. 16-615 JONES & LAMSON Thread Grinder, Late
Two—No. 4T SELLERS Tool Grinder, New 1941
One—No. 6T SELLERS Tool Grinder, New 1941
No. 172 BARNES Hydraulic Honing Machine, New 1940
Three—Model H1-MICROMATIC Hydrohoners, Late

MISCELLANEOUS MACHINES

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No. 1 LONG & ALSTATTER Single End Punch and Shear, Late

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4	7350 "	1" x 0.049"	12	1700 "	1 1/2" x 0.059"
5	7000 "	1" x 0.059"	13	1300 "	1 3/4" x 0.059"
6	5700 "	1 1/4" x 0.049"	14	1100 "	2" x 0.059"
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BORING MILLS, 72" N.B.T., PRT, M.D.
BORING MILL, 72" Gisholt, 2 hds., P.R.T.
BORING MILL, 62" Gisholt, 2 hds., P.R.T., M.D.
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BORING MACHINE, 3" Bar Universal, Table Type
BONE-HONE, Barnes 10" stroke, '42
DRILL, 25" Waisel, Tapping, M.D.
GEAR HOBBER, No. 36H Gould & Eberhardt
GEAR GENERATOR, 3" Gleason, Straight, Late
GEAR PLANNER, 11" Reimaker, Bavel, A.G., M.D.
GEAR SHAPERS, Nos. 61, 61A & 61A Fellows, 1945
GEAR SHAPER, No. 6 Fellows
GRINDERS, FACE, 84" Builders, 32" wheel
GRINDER, SURFACE, 14" P. & W. Vert. Spins, B.B.
GRINDER, 30" x 120" Landis Hyd. Type B
GRINDER, 18" x 48" Cisel, Plain, Cyl.
GRINDER, Uni., 12" x 38" Thompson, M.D.
GRINDER, #16V28 Bryant Int., 1943
GRINDER, Micro Int. M.D.
GRINDER, No. 8-T Sellers Tool, '42
LATHE, 60" x 45" cen. Mackintosh-Humphill, 1942
LATHE, 60" x 30" Bed, Feed, Cons M.D.
LATHE, 42" x 31" cen. Putnam, T. A., M.D.
LATHE, 38" x 20" cen. Putnam, 2 carr., T. A.
LATHE, 32" x 25" cen. Pittsburgh, 2 carr., T. A., '42
LATHE, 30" x 10" cen. LeBlond, 3 cons, QCG T.A.
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LATHE, 12" x 6" Bed Reed Prentiss, Grd. Hd.
LATHE, 12" x 6" Bed Henday, Grd. Hd.
TURRET LATHE, No. 5 Gisholt, Chuck, '42
TURRET LATHE, No. 3AL Gisholt, 6 1/2" hole in spin.
TURRET LATHE, 28" Libby, "C" 4 1/2" empty.
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TURRET LATHE, No. 2B Foster, Univ. 3 1/2" empty.
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726 1/2 HAMILTON	6 1/2	150	8	22	36 x 72
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94 1/2 TOLEDO	7-7 1/2	180	4	22	38 x 66
545 1/2 HAMILTON	5 1/2	106	4	12	34 x 54
846 1/2 HAMILTON	6 1/2	150	6	20	38 x 84
93 1/2 D TOLEDO	6-6 1/2	126	4	18	34 x 54
446 1/2 HAMILTON	6 1/2	126	12	26	36 x 66
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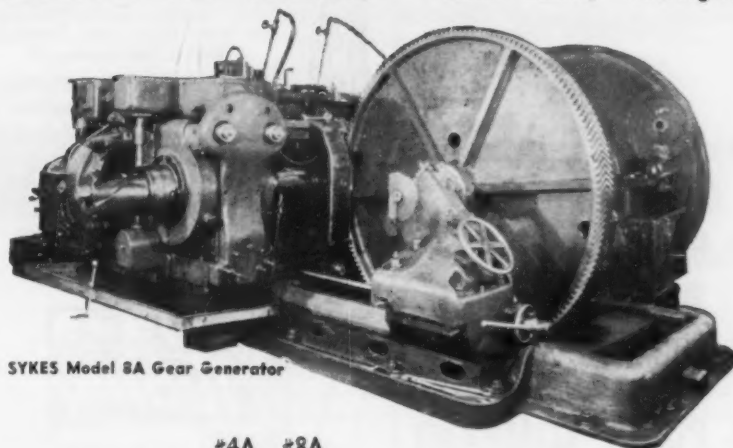
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1	1200	Whse.	Encl. (Rev.)	600
1	800	Whse.	Encl. (Rev.)	600
1	350	G.E.	CD-160	1150
1	325	Whse.	QM-600.6	450/900
1	200/250	El.Dr.	225	400/1200
1	200	G.E.	MPC	500/1200
1	200	Whse.	Mill	300/1200
1	200	Whse.		340/300
1	180	G.E.	MPC	400
1	150	C.W.	83-H	800
1	125	Whse.	SK-190	400
1	100/125	Rel.	1995-F	300/1200
1	100	Rel.	1050-T	400/1200
1	90/100	G.E.	MPC	825/1125
1	50/75	Rel.	1995-F	300/1200
1	35	G.E.	BP-14	500/1500
1	35	G.E.	CD-125	400/1200
1	35	G.E.	CD-147	300/1200
1	35	Rel.	35P	250/1000
1	32 1/2	Whse.	SK-150	400/1200
1	30/75	Whse.	SK-151L	400/1200
1	30	Al-Ch.	E-145	400/1200
1	30	G.E.	CDM-105	875/1750
1	27 1/2	El.Dr.	15S	450/1350
1	25	G.E.	BP-13	400/1000
1	25	G.E.	CD-123	400/1300
1	25	Whse.	SK-140	400/1200
1	25	Whse.	SK-111L	250/1000
2	20	Al-Ch.	B-130	400/1200
2	20	G.E.	CD-123	300/1200

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1	2400 (3-U)	Whse.	720	600	4800/2400
1	1500	Whse.	514	250	4800/2300
1	1000	G.E.	514	250	2300
1	500	C.W.	720	250/275	2300/440
2	500	C.W.	720	275	2300/440
1	250	Whse.	1200	125/250	2300
1	200	Ridgway	900	275	2200
1	155	G.E.	720	250	2300/440
1	150	G.E.	1200	500	2300/440
1	100	C.W.	1200	125	440/220
1	100	Delco	1200	125/250	440/220
1	100	Ridgway	1200	275	4000/2300
1	85	C.W.	1200	250	2300/440
1	75	Star	1200	230	440/220
1	75	Al. Ch.	900	250	2300
1	75	Whse.	900	75	2200
1	25	Ideal	1750	125	220
1	20	Al. Ch.	1200	250	440/220
2	15	Al. Ch.	1200	250	440/220
1	15	G.E.	1200	250	440/220
1	10	Whse.	1200	250	440/220

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2	1000	Al-Ch.	ANY	2300	235
1	400	G.E.	MT-20	2300	360
1	400	Al-Ch.	ANY	2300	514
2	500	G.E.	1-16-M	2300	450

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	400	G.E.	MT-412	1200	450
1	300	G.E.	1-18-M	2200	1200
1	300	Al-Ch.	ANY	2300	514
1	250	G.E.	MT-414	2300	360
1	200	G.E.	1-18-M	2200	585
1	150	G.E.	1-13-M	2200	1750
1	125	Whse.	CW-870	2200	870
1	100	F.M.	H20C	440/220	900
1	75	G.E.	IM	440/220	600
1	75	Whse.	CW-7540	440/220	600
1	40	Whse.	CW	440/220	900
1	50	G.E.	MT-330	2200	1150
2	50	Al-Ch.	ARY	440/220	900
1	50	F.M.	SR	440/220	600
1	40	Al-Ch.	ANY	2200/440	435

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1	300	Whse.	80	440	514
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1	150	G.E.	100	2300	900
1	150	G.E.	100	550/2200	600
1	150	G.E.	80	550/2200	450
3	125	El. Mch.	100	4800/3400	900
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
1	100	Whse.	100	2300	1200
1	100	Ideal	80	220/440	900
2	100	G.E.	80	220/440	600
1	60	G.E.	80	230/440	1200
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1	1800	G.E.	360	275	4400
1	1500	Whse.	600	800	4180
1	1400	Whse.	360	700	2300
1	1000	G.E.	900	600	4150
1	1000	Whse.	900	600	4180
1	750	Whse.	900	275	4180
1	750	G.E.	900	275	2300/4180
1	800	G.E.	720	125	2300
1	800	Whse.	900	125/250	440
1	500	G.E.	900	800	2300
1	400	G.E.	900	275	4180
1	400	G.E.	1200	120/240	440/2300
1	400	G.E.	720	250	550/2300
1	400 (3U)	Cr. Wh.	1200	125/250	2300
1	350	G.E.	900	125	2500/4180
1	180	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	140 (3U)	Cr. Wh.	600	125/250	440/2300
1	100	Delco	1200	120/240	2300
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1	75	G.E.	1200	250	440
1	75	Cr. Wh.	1180	250	220/440
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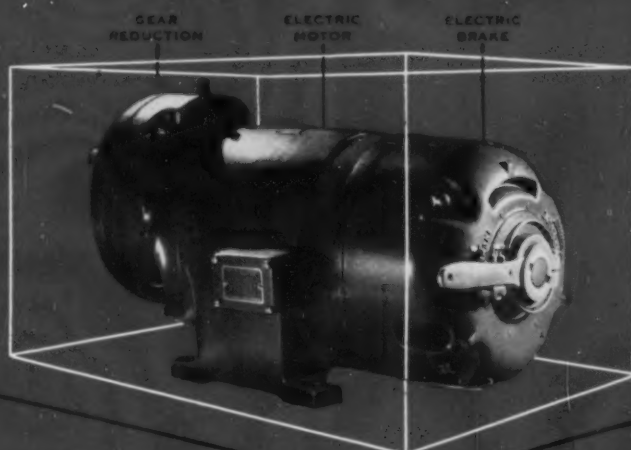
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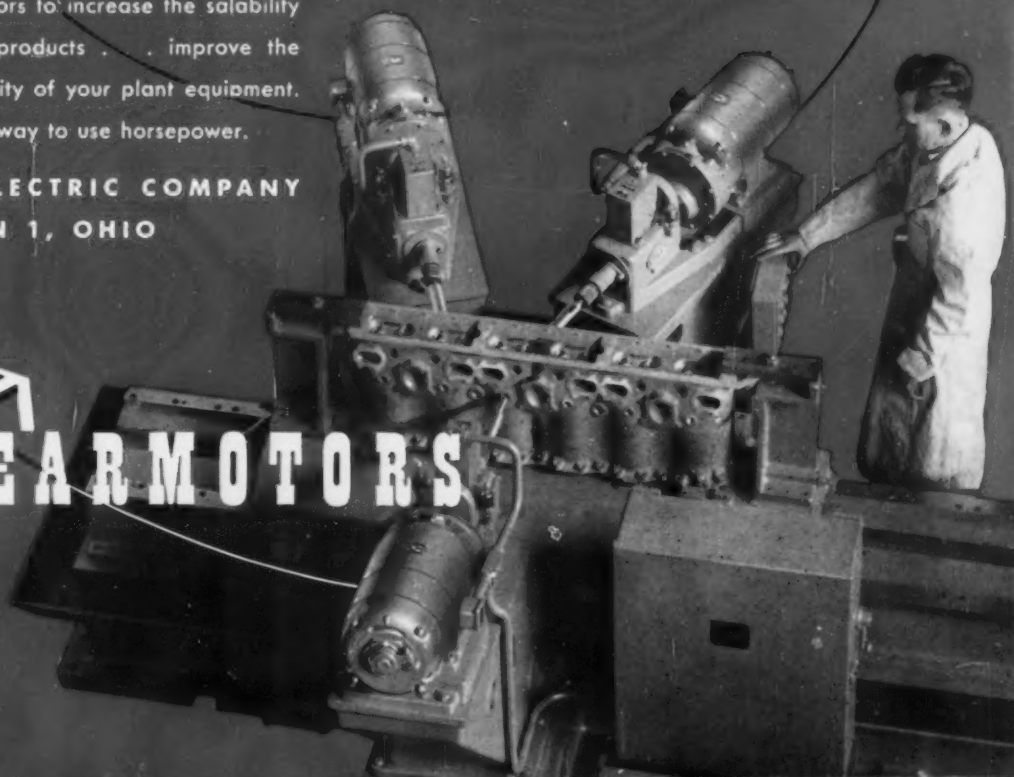
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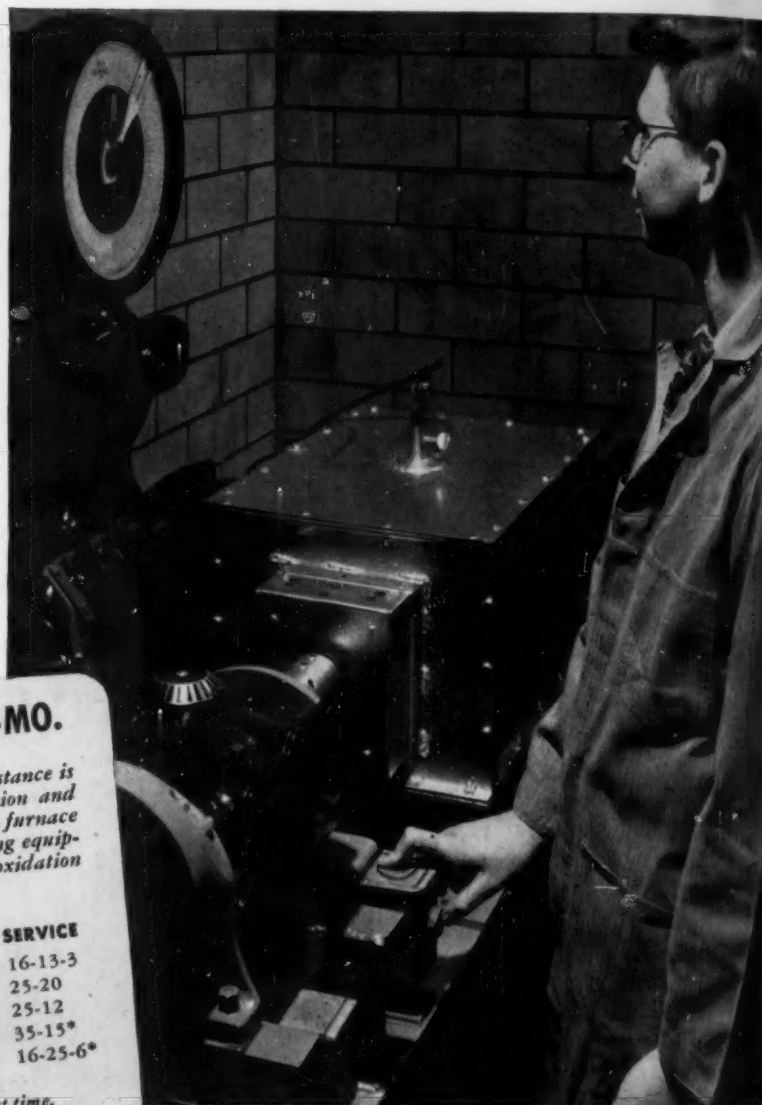


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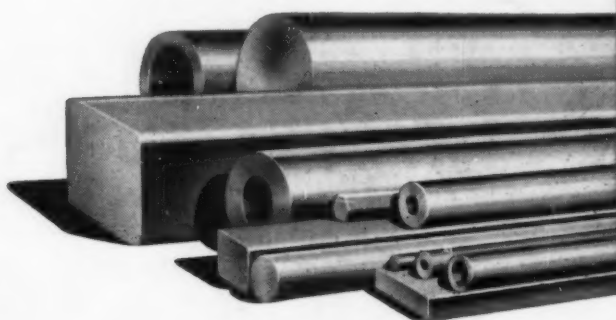
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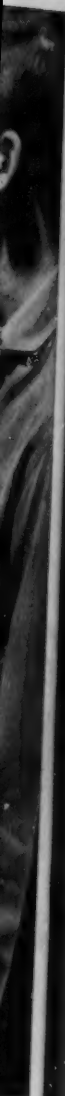
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